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ABSTRACT

Designed for use in a secondary or undergraduate level course non global development, this case study examines the current crisis in the world food supply. The study is divided into three main parts, each dealing with a key question of world food supply: (1) What Is Hunger? (2) Why Is There Hunger? (3) What Is Being Done? Section 1 defines hunger in terms of nutrition, humanity, and development, providing a brief history of the food shortage. Section 2 analyzes the factors responsible for the present condition of the world food supply including the role of nature, the role of agricultural production, and the role of government policy. Section 3 discusses research and relief programs and the United Nations World Food Conference. Also included in the study is an instruction guide which suggests techniques and resources giving greater depth of understanding to the issues. The guide contains a discussion of key teaching strategies, tips on methodology, suggestions on topics and questions for classroom discussion, and information on resource materials and organizations. (Author/DE)

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WORLD FOOD SUPPLY

A Global Development Studies Case Study Revised Edition 1975

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PREFACE

World Food Supply focuses upon the single most vital of the many global issues confronting humanity. Adequate, nourishing food supply is the prime essential to human development, indeed to human life. This prime essential is available in too little quantity for growing millions of earth's population, resulting in hunger, malnutrition, mental retardation, physical disease, and death from starvation. No economic and social development programs, however well conceived and administered, can hope for success if the target population suffers from widespread dietary deficiencies.

Just as the forests, minerals, and other resources of the world are unevenly distributed, so are the lands and waters capable of producing food. As the balance in any one country between food production capability and consumption needs is accidental, international shipment of food from surplus to defecit areas is the largest and most important trade pattern in the world. Production, distribution, and marketing of food is the largest industry within countries, because it is the single product that must be available to each person each day.

It is surprising to find that little educational attention is given to so large and vital a topic as food supply, particularly in societies which are largely urban, industrialized and affluent. The kitchen refrigerator holds the breakfast, the school cafeteria provides lunch, and from the supermarket come in the ingredients for dinner. This daily occurance makes headlines only when prices of meat, vegetables, or staples rise rapdily, or when favorite varieties become scarce. Normally, we eat without a thought concerning the source of the food or a worry as to where our next meal is coming from. We may read about hunger elsewhere, or observe its effects for a few moments on television, and we may donate a few dollars to church or charity for hunger relief, but otherwise we rest ignorant of the desperate, daily search for something to eat that is the fate of vast and growing numbers of our fellow humans.

J. Carlisle Spivey has taken the multiple, complex issues involved in global hunger and presents them in comprehensible, interrelated form. In World Food Supply she offers a case study of a global system that is in severe disarray, so that students may gain a comprehension and appreciation of their own lives and actions, interdependant with those of others. This case study is designed primarily to be used within a full course on Global Development Studies at undergraduate

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colleges and secondary schools, so that this one issue can be understood in conjunction with others of mounting golbal importance.

Miss Spivey's study was first issued in September, 1974, and during the past year it has been used widely in formal education, both in the United States and in many other countries. It has also been used by less formal study groups conducted by church and community organizations.

This revised and enlarged edition has benefited from the evaluations of those who have worked with it in education and from many thoughful critiques offered by scholars, international and national government administrators, nutritionists, agri-business executives, and foundation experts. Miss Spivey's experience during the past year in attending food conferences, including the World Food Conference in Rome, and participating in workshops with teachers and students also adds to the authenticity of this case study.

Miss Spivey holds a master's degree in international relations from the University of Pennsylvania and a bachelor's degree from Goucher College. She is Assistant Director of the Management Institute for National Development. The Institute, a non-profit, tax-exempt educational corporation under New York education law, assists those in formal education and community groups who wish to implement Global Development Studies by providing curricula, methodologies, teacher training, and materials such as this case study, World Food Supply.

Wilmer H. Kingsford
President
Management Institute for
National Development

INTRODUCTION

We live in an interdependent world. Every person, every government and every system -- whether economic, social, ecological or political -- is affected. One purpose of education is to prepare the next generation for the world they will meet as adults -- in this case, an interdependent one. This is where Global Development Studies comes in -- to provide the knowledge and awareness of the world as an interdependent global community. Combined with this should be the understanding and acceptance by each person of his "inescapable responsibility for the welfare of the global community".[1]

To help teachers teach and students learn this rather staggering concept, the Management Institute for National Development issued a Global Development Studies Model Curriculum in the Fall of 1973. The course is necessarily interdisciplinary including in it a great many topics -- among them population growth, use of limited natural resources, economic development, social customs, trade and finance, and multinational organizations. One of the primary methods suggested in the model curriculum is that of the case study. The purpose of this approach is to take the theories of global development presented in the model curriculum and tie them down to reality, at the same time providing the student with an informed frame of reference for today's headlines.

The product of this need is World Food Supply: A Global Development Studies Case Study. Although labeled a case study, it differs from the traditional form of case study in one essential way -- it provides no set answers. The traditional case study takes a 'known' as a point of departure -- an historical problem to analyse, pointing out the who, what, where, when, how and why and the reasons for the success or failure of instituted solutions. The problem when dealing with world food supply is the shortage of 'knowns'. There are no answers. This is frustrating and confusing at first to both teachers and students who are used to questions with right or wrong answers. But it is real life and real life is an exciting challenge.

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[1] Management Institute for National Development, Global Development Studies Model Curriculum for Secondary Schools and Undergraduate Colleges and Universities, New York, Management Institute for National Development, 1973, p. 5.

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An important point of global development studies is learning that yes/no, right/wrong answers have no place. The world condition can be studied, analysed, commented upon. Programs and policies can be instituted to affect the situation. But the complexity and interdependence of the problem's all-encompassing factors make simplistic, superficial solutions irresponsible. It is more important to be able to recognize factors and understand their interdependence and complexity and their relationship to the whole area of global development, for this is the sphere in which todays' students must operate as adults.

The study is divided into three main parts each dealing with a key question of world food supply: What is Hunger?, Why is There Hunger?, and What is Being Done?. Each section has a short introduction outlining the content of its following discussions.

The first section -- What is Hunger? -- contains three discussions:

HUNGER: WHAT DOES IT MEAN?, defining hunger and malnutrition in terms of nutrition, humanity, and development

A BRIEF HISTORY OF FOOD AND POPULATION, briefly outlining the growth of food and population that culminated in the shortages of the 1970's.

WORLD AGRICULTURAL FOOD SUPPLY: TODAY'S WORLD, delving deeper into the long and short-term factors that produced today's high prices and shortages and inequities.

The second major division -- WHY IS THERE HUNGER? -- also represents three discussion units. These deal with three categories of factors responsible for the present condition of world food supply:

- NATURES'S ROLE
- THE ROLE OF AGRICULTURAL PRODUCTION
- THE ROLE OF GOVERNMENT POLICY

It is emphasized that these are not static divisions, but dynamic realities in a state of constant intra- and inter-reaction. They are separated in an attempt to make the recognition of each determinant and its role in the problem simpler to grasp.

The three parts of the third section -- WHAT IS BEING DONE? -- discuss research and relief programs and the U.N. World Food Conference:

THE GREEN REVOLUTION AND AGRICULTURAL RESEARCH PROGRAMS
WORLD FOOD SHORTAGE: AID PROGRAMS
UNITED NATIONS WORLD FOOD CONFERENCE: A PROMISE TO THE FUTURE?

The major emphasis is on the many varied sources of research and aid programs: international, regional, national, private, public, profit and non-profit sectors.

The final discussion is a short summary of the study.

Also included in the study is an Instruction Guide suggesting techniques and resources to give greater depth to understanding. It is designed for teacher and student since both are learners in this instance.

The Guide includes:

- discussion of key teaching strategies
- tips on methodology
- suggestions on topics and questions for classroom discussion
- information on resource materials and organizations and how to use them in conjunction with this study.

The depth to which the study is pursued depends on the level of sophistication and interest of the class and the period of time allocated for the study.

Because the brunt of the inequity of world food supply is felt mostly in the developing countries, the emphasis of this study is there. It is stressed, however, that the problem is an international one in cause, affect and need for action. It is designed for the non-specialist but assumes the learning skills of upper level general education (high school and introductory college). Teachers at lower grade levels will wish to adapt the study to relevent learning skills.

There is no attempt to ascribe blame, guilt, or make any other judgment. Such is not the duty of an intellectual tool. It is assumed that the student has at least a fairly good background and understanding of the theory of Global Development and the factors involved in that area of study.

It is not possible to name all the many, many people who have given of their time and generously of their thoughts, advice and encouragement as this project has unfolded and been revised. To them is owed a profound debt of gratitude. My particular thanks go to Bill Kingsford who struggled valiantly with me over content and phrasing in the study and its revision; Ed Babbott who risked his eyesight and sanity in proof-reading and lent his valuable professional advice to make the Instruction Guide, in particular, a useful material; John Rorke who also helped greatly with the Instruction Guide; Angus Archer who helped me keep up with the UN Organizations and the UN World Food Conference; and to Heath Boote and Debbie Truhan who generally put up with me and the study.

J. Carlisle Spivey
Assistant Director

QUESTION I

WHAT IS HUNGER?

It is virtually impossible for most people living in a developed country to imagine a life of starvation, or continually threatening starvation, and the resulting disabilities and diseases. Slight in-between-meal twinges are probably the nearest the majority has ever come; and these twinges are easily silenced by a quick, readily available snack. An inability for empathy, however, does not preclude an ability for sympathy and recognition of the urgent need to understand and act upon the very intense and real suffering that afflicts two-thirds of the world and the constraint this suffering places on development.

HUNGER:

WHAT DOES IT MEAN?

The first step in defining hunger is to make the distinction between hunger and malnutrition. Hunger is the lack of food; malnutrition is the lack of nutritionally proper food. The chronically hungry person is malnourished, but the victim of malnutrition is not necessarily hungry. The problem, therefore, is not simply feeding the world, but feeding it properly.

There are three types of malnutrition -- calorie malnutrition, protein malnutrition, and a combined calorie/protein malnutrition. For adequate nutrition there are three main groups of essential nutrients -- carbohydrates and fats, proteins, and vitamins and minerals. Water is also a basic requirement. Carbohydrates and fats provide man's main source of fuel for energy necessary for work and basal metabolism. Adequate carbohydrate and fat requirements, measured in calories, should balance the daily energy output and, therefore, depend on the individual's activity. Other factors also influence the daily caloric requirement: sex, age, body weight, occupation, personality, climate and muscle mass. Caloric norms can, therefore,vary greatly. For example, nutrition experts range the calorie requirements of an 'average western man' (weight, 154 pounds) from 1,500 to 5,000, depending on the type of physical activity he sustains:[1]

NUTRIENT REQUIREMENTS

CALORIES

- minimum activity requires 1,500 to 1,600 calories a day
- office work alone requires 2,000 calories a day
- 'normal' physical activity requires 3,000 calories a day
- heavy work requires 5,000 calories a day

Protein is necessary for the growth and repair of organic structures and tissues. The average requirement is less than that of carbohydrates and fats -- 53 grams a day for the 'average' western man'.[2] The three principle sources

PROTEINS

[1]Georg Borgstrom,Harvesting the Earth, New York: Abelard-Shuman, 1973, p. 148-150.

[2]WHO Technical Report Series #522, Energy and Protein Requirements FAO Nutrition Meetings Report Series #52, 1973.

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of protein are fish, beef, and pulses (leguminous seeds, such as peas, beans and soybeans). Animal proteins (milk, eggs, cheese, meat, fish) provide a higher quality of protein than legumes and a better balance of amino acids vital for body development.

The final group of basic food requirements are vitamins and minerals. They are necessary for adequate body functioning. They also provide necessary materials for bones and teeth.

PHYSICAL EFFECT

Prolonged deficiencies break down the human being's physical and mental powers and his psychological balance. In the process of physical deterioration the adult heart is reduced to the size of a child's. The eyes become sunken and dull, the hair dry and drab. Gangrene and erosion affect the lips and cheeks. Tissues become wasted. Edema sets in so that water in the body builds up causing the victims' stomachs to become grossly bloated. Because digestive enzymes are not produced, chronic diarrhea results.

EFFECTS ON CHILDREN

Hunger can affect a child even before it is born. The mother's health is extremely important for the development of the fetus. The poor nutrition of the mother greatly reduces the chance of a strong, healthy baby. For approximately six months after birth, the child retains immunities acquired in the mother's womb. Once these immunities wear off, the child is completely vulnerable to disease -- for example, malaria, whooping cough, and diarrhea. Hunger weakens his resistance even further, making the death-rate soar.[3]

The weaning period is a crucial time for the child. It is during this period that the pernicious malnutrition/infection cycle can begin. The child's defenses against infection are torn down by undernourishment. The result is tragic and often fatal. Hunger has profound effects on physical growth. In many developing countries, the average twelve year old has the physical stature of an eight year old in Western Europe and North America. Where protein malnutrition exists with chronically high incidence, a large number of the population can never reach their full potential because of childhood malnutrition.

Malnutrition leaves the body increasingly defenseless against disease. The healthy can shake off childhood and other minor diseases as passing infections. For the malnourished such illnesses present a real danger. In Ecuador, for example,

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[3]In Africa, for example, 180-200 of every 1,000 children die during the first year. This is about eight times higher than most countries of Europe and North America.

the frequency of death for children from measles is 300 times that in North America.[4]

DEFICIENCY DISEASES

Dietary deficiencies are also responsible for the diseases that plague the victims of malnutrition. These diseases often result in drained vitality, and in lowered effeciency, alertness, endurance and creativity, without showing precise symptoms. There are a vast number of deficiencies (see chart at end of chapter). They can be separated into two closely linked groups: protein/calorie deficiency and mineral/vitamin deficiency. The two main diseases of the former group are Kwashiorkor and Marasmus.

KWASHIORKOR

Kwashiorkor is prevalent in large parts of Southeast Asia and Africa, especially West Africa. The cause is a lack of protein. It particularly affects children who are put on a starchy adult diet immediately after weaning. The symptoms are a general apathy, an edemic stomach, wasted muscles, and discoloration and swelling (sometimes accompanied by peeling) of the skin. Diarrhea is also sometimes symptomatic of Kwashiorkor. If prolonged and untreated, the results are retarded growth, greatly reduced resistance to other diseases, and frequently death. Treatment takes the form of special high protein fluid feeding which contains skim milk protein and vegetable protein.

MARASMUS

Marasmus symptoms are similar to Kwashiorkor, but with no rash or swelling of the skin. Wasting of the body tissue prevents proper functioning and severe vomiting and diarrhea are present. Starvation is the cause of Marasmus. Usually death results from loss of body fluids. The treatment is similar to that of Kwashiorkor.

VITAMIN/ MINERAL DEFICIENCIES

Calorie/protein deficiencies usually accompany vitamin/mineral deficiency diseases. Included in the latter are Beri-beri, Pellagra, Avitaminosis A, Rickets, Osteomalacia, and Goiter. Beri-beri, which causes the wasting and paralysis of the limbs and leads to heart failure and signs of nervous disorder, is caused by lack of Vitamin B, particularly the thiamine type. It is common in those Asian countries where polished rice is the staple of the daily diet. The polishing process removes the husk which is rich in Vitamin B. The treatment for Beri-beri is a diet with high thiamine content. Another disease caused by deficiency of Vitamin B, this time due to a lack of niacin, is Pellagra. Results, if untreated, are the three D's: Diarrhea, dementia and dermatitis. It is common among those whose diet is made up

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[4]Georg A. Borgstrom, "The Dual Challenge of Health and Hunger--A Global Crisis", Population Reference Bureau, Inc., Selection #31, Washington, D.C., p. 4.

[5]Oxfam Information Center, Diseases Attributable to Malnutrition, August, 1970, p. 2.

mainly of maize. Treatment consists of a well-balanced diet with plenty of meat and green vegetables.

Avitaminosis A, caused by Vitamin A deficiency, results in blindness. Cases are most commonly found in Asia, Latin America, and Indonesian ports among children six months to three or four years old. Treatment takes the form of the addition of large amounts of Vitamin A to the victim's food.

One of the main causes of death in child-birth in developing countries is Nutritional Anemia. Besides expectant mothers, young children are also victims of this disease. The cause is shortage of iron in the bloodstream; the cure is addition of meat, liver and other foods containing iron to the diet.

Rickets and Osteomalacia share result, cause and cure. The results are deformities of the skull, legs, spine and pelvis. Vitamin D deficiency, preventing the proper absorption of calcium and phosphorous needed for growth and maintenance of normal teeth and bones is the cause. The cure is a diet rich in Vitamin D, found in large quantities in fatty fish (such as cod), butter, liver, and frequent exposure of the skin to sunlight. Rickets' victims are children; Osteomalacia's are adults, usually pregnant or lactating women.

Goiter results in retardation of fetal development and of normal physical growth, and the enlargement of the thyroid gland. This malady is the result of an iodine deficiency in the diet. Approximately 200 million people suffer from endemic goiter, the most common form of the disease.[6]

It is important to note that the treatment cited for each deficiency disease involves the immediate and intensive supplementation of the lacking nutrient to the victim's diet. Once the treatment is successful, however, the person returns to his previous life, too often in abject poverty where the maintenance of adequate protein/calorie or vitamin/mineral diet requirements is as impossible as before the treatment.

MENTAL EFFECTS

The individual's mental capacity is also directly affected by malnutrition. These effects, as with the physcial damage, may begin even before birth. There is increasing evidence that prenatal and early childhood protein malnutrition causes damage to the development of the brain and central nervous system. In a study in Mexico, children with severe malnutrition achieved an IQ thirteen points below those with proper protein nutrition.[7] The damage is irreparable.

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[6] Ibid.

[7] Lester R. Brown and Erik P. Eckholm, By Bread Alone, New York: Praeger Publishers, 1974, p. 31.

So affected as a child, an individual can never hope to obtain the full human potential as an adult.

PSYCHOLOGICAL EFFECTS

Malnutrition is as devastating psychologically as it is to growth physically and mentally. Such effect shows itself in a feeling of lethargy, a lack of initiative, and indifference to others. The starving person is easily disturbed by noises and petty irritations; he becomes quarrelsome, often violent. In the last stages, desperation is virulent -- parents may steal food from their children and murder may be committed in the frantic search for food.

EXTENT OF PROBLEM

The point should be emphasized that no one knows exactly to what extent hunger and malnutrition exist in the world today. They strike heaviest and hardest in the developing countries In the developed countries, the proportion of the population affected by this problem has generally been a small minority. In the United States, for example, about ten to fifteen per cent of the 200 million people are hungry or malnourished. Although this may seem numerically a small part of the whole, it must be remembered that this ten to fifteen per cent represents about twenty to thirty million individuals who are being denied one of man's most basic needs and rights.

MEASUREMENT PROBLEMS

Few studies have been done by individual countries most affected, for their energies are directed towards other areas in an effort to develop quickly, assigning the problem of malnutrition a backseat. When studies are attempted, they often run up against substantial barriers. An adequate food supply evaluation for a country requires two types of measures: a recent food balance sheet and several food consumption surveys. The purpose of a food balance sheet is to put together a statement of food availability per capita, taking all supply and disposal techniques into account.[8] This study is derived from statistics on:

- food production
- meat, milk, and egg production
- non-food use of crops
- fish production
- foreign food trade
- nutrient conversion factors
- population

Food consumption surveys are developed to judge the influence on food consumption by factors such as:

- income
- place of residence
- ethnic group

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[8]Gibbons, C.A., Catt, D.C., Hankin, R.C., MacArthur, J.D., Gravel, P.B., The Problem of Collecting Data on Food Production and Farming in African Economies, Comox, Canada: Peter McLoughlin Associates, Ltd., 1974, p. 28.

- season
- household size.

When food supply evaluations are attempted in developing countries, basic administrative and technical difficulties often arise, as do problems created by cultural influence on supply and demand.[9] Administrative difficulties include:[10]

- the poverty of governments
- understaffed statistical bureaus
- difficulty of attracting workers to a relatively "unglamorous" job.

An important technical difficulty is that agricultural statistics, which have been developed in the West, basically rest upon the market-place agricultural economy. It is at the point of marketing crops and products that volumes and varieties can most easily be measured and these measurements used to provide the raw data for food surveys.

In many developing countries, subsistance farming occupies large portions of the population. The produce of subsistance agriculture does not enter the market-place economy; hence western statistical techniques inadequately cover highly significant data on total food resources in countries where subsistance farming is wide-spread.

One thing, however, is definite -- the problem is huge. The number of people in the world plagued by malnourished diets is estimated at more than 400 million. Other estimates provide more detail for this gruesome statistic:

- malnutrition affects approximately sixty percent of all children alive today[11]
- 300 million children in developing countries suffer from "grossly retarded" physical growth attributed to malnutrition[12]
- malnutrition is the biggest single contributor to child mortality in developing countries. In Latin America, studies show it to be the main cause or major contributing factor in fifty to seventy-five percent of deaths of children one to four years. old.[13]

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[9] Ibid., p. 6.

[10] Ibid.

[11] Oxfam of Canada, Educational Sheets on International Development, Set A.

[12] Barbara Ward and Rene Dubos, Only One Earth, New York: W. W. Norton and Company, Inc., 1972. p. 156.

[13] Brown and Eckhom, op. cit., p. 30.

What do hunger and malnutrition mean? In the short run, they mean that daily life is made a constant, often tortuous struggle for survival. This means that the individual can neither live effectively, work efficiently, nor reason well beyond his next meal -- "His whole potential as a human being is at low ebb."[14] In the long run, they mean the creation of a physical and intellectual dead-weight on the society, the opposite of the human requirement needed for the developing (or, for that matter, the developed) countries.

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[14]John McHale, World Facts and Trends, New York: The MacMillan Company, 1972, p. 38.

DEFICIENCY DISEASE	TYPE OF DEFICIENCY	MAJORITY OF VICTIMS	CAUSE	SYMPTOMS	RESULT IF UNTREATED	TREATMENT
KWASHIORKOR	Protein/ Calorie	Southeast Asia & Africa. Children put on starchy adult diets immediately after weaning.	Lack of Protein	General apathy, edemic stomachs, wasted muscles, discoloration & swelling of the skin (and sometimes peeling), diarrhea.	Retarded growth, greatly reduced resistance to other diseases, death.	Special high-protein fluid feedings, containing skim milk protein and vegetable protein.
MARASMUS	Protein/ Calorie	Southeast Asia & Africa. Children put on starchy adult diets immediately after weaning.	Starvation.	General apathy, edemic stomachs, wasted muscles, vomiting and diarrhea.	Death from loss of body fluids.	Special high-protein fluid feedings containing skim milk protein and vegetable protein.
BERI-BERI	vitamin/ mineral	Asian countries where polished rice is a staple of the daily diet	Lack of vitamin B, particularly the thiamine type.	Wasted limbs paralysis of limbs	Heart failure signs of nervous disorder	Diet with high thiamin content.
PELLAGRA	vitamin/ mineral	Common among those whose diet is made up mostly of maize.	Lack of vitamin B, particularly the niacin type.		Diarrhea, dementia and dermatitis.	Well-balanced diet with plenty of meat and green vegetables.
AVITAMINOSIS A	vitamin/ mineral	Asia, Latin America, and Indonesian ports. Children six months to three four years.	Lack of vitamin A.		Blindness	Large amounts of vitamin A found preformed in animal products and carotenes in vegetables.

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DEFICIENCY DISEASE	TYPE OF DEFICIENCY	MAJORITY OF VICTIMS	CAUSE	SYMPTOMS	RESULT IF UNTREATED	TREATMENT
NUTRITIONAL ANEMIA	vitamin/ mineral	Expectant mothers and young children.	Shortage of iron in the bloodstream.		Death.	Addition of meat, liver, and other foods containing iron into the diet.
RICKETS	vitamin/ mineral	Children	Vitamin D deficiency, preventing the proper absorption of calcium and phosphorous.		Deformities of of the skull, legs, spine; and pelvis.	Diet rich in vitamin D, found in large amounts in fatty fish liver, butter and sunlight.
OSTEOMALACIA	vitamin/ mineral	Adults, usually pregnant or lactating women.	Vitamin D deficiency, preventing the proper absorption of calcium and phosphorous.		Deformities of the skull, legs, spine, and pelvis.	Diet rich in vitamin D, found in large amounts in fatty fish liver, butter and sunlight.
GOITRE	vitamin/ mineral		Iodine deficiency in the diet.		Fetal development & normal physical growth retarded. Enlargement of the thyroid gland.	Addition of iodine in the diet

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A BRIEF HISTORY OF FOOD AND POPULATION

"Civilization, as we know and define it today, is a development the last 10,000 years and owes its origins to agriculture."[1]

When man began to farm he shifted his reliance from adaptation to his environment to the modification of it for his livelihood. Over the centuries, from BC to AD, key discoveries have governed this modification: irrigation, fertilization, the harnessing of draft animals, the exchange of crops between the Old and New World, the development of chemical fertilizers and perticides, advances in the study of genetics, and the internal combustion engine.[2] The earliest of these discoveries was the method of irrigation, a process which now accounts for one-seventh of today's croplands. Use of fertilizers opened up new land, previously unuseable due to lack of necessary substance or nutrients in the soil, to farming and increased yields of areas already under cultivation. Harnessing of draft animals added significantly to man's muscle power and the efficiency of his labor, enabling a small part of the population to take part in some economic activity other than agriculture. The discovery that some native crops grew better in the soils of other lands prompted crop exchange between countries. Such crops include the potato and the coffee bean. Once the twentieth century was well under way and man had settled the last frontiers, chemical fertilizers and pesticides, first produced in the mid-nineteenth century, first became commercially important. They offered a method to increase food supply without cultivation of additional land. Man discovered that altering the genetic make-up of domesticated plant and animal species, such as corn, milk cows, wheat and chickens, increased, among other things, their ability to produce and to withstand disease and the elements. Finally, the discovery of the internal combustion engine added greatly to the available energy supply needed in the production of food.

KEY DISCOVERIES

The present-day world population began its growth from the sixteenth to the eighteenth centuries, rising most sharply

POPULATION GROWTH

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[1] Oxfam of Canada, Development of Agriculture, Educational Sheets on International Development, Set B., p. 2.

[2] Brown and Eckholm, op. cit., p. 20.

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in the 1800's. Before the Industrial Revolution, the size of communities was relatively set by, among other things, their dependence on adequate food supply. The Industrial Revolution introduced mechanized methods of agriculture and made it possible to feed more people with less of the population working on the land than off of it. As a result, European cities increased their population by as much as six times in the second half of the nineteenth century.

FOOD AND POPULATION

Over the last 150 years, the population has increased by two and a half billion. From the end of World War II until 1970, the developing countries were just able to balance the supply of food with the ever-growing demand of an ever-increasing population. In the developed countries, rising population was met with rising food production and surplus stocks built up, mostly in Canada and the United States. These stocks provided security against shortages and helped provide comparative price stability for the main food products in these areas. The result of this period in the developed countries, with production increasing faster than effective demand, food stocks growing, and government action to maintain farm prices, was a false sense of security about world agricultural food supply.

In reality, the situation was not one to breed such a feeling of security. In developing countries, agricultural production was not increasing fast enough to allow any significant increase in per capita supplies; without the Green Revolution (see Chapter VIII) of the late 1960's, many of these countries would have experienced actual decline in production per capita. In the industrialized nations, the increased production that resulted in surplus stocks created a large-scale public and government reaction against such a scale of production. As a result, the rate of agricultural growth slowed down in many major export countries. In the centrally-planned-economy countries,[3] agricultural production did not keep up with the demands resulting from economic development.[4] At the same time, the government was, more than ever before, directing its policy toward satisfying the consumers' needs. The result was a progressive decline in grain stocks.

From 1945 to 1970 the world was lulled into a false sense of security, feeling well-protected from shortages and accompanying price instability. At the same time, production lay stagnant or decreased as demand increased. Without ever realizing it,

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[3] Such countries are the Soviet Union and the Soviet Bloc countries of Eastern Europe, such as Poland, Czechoslavakia, Rumania, Bulgaria, etc.

[4] A. Simantov, "What Can Be Learned From Recent Difficulties in Agricultural Markets", The OECD Observer, No. 68, February 1974, p. 6.

the world moved into a situation of insecurity in relation to agricultural supplies, exposed to unforeseen conditions, events, and emergencies such as those which occured in 1972 and 1973.

WORLD AGRICULTURAL FOOD SUPPLY:

TODAY'S WORLD

In the 1960's the problem of food shortage was identified as a race between food production and population growth. By the 1970's an added factor was recognized -- rising affluence, representing a new major claim on world agricultural reserves. In West Germany, for example, population growth has virtually stopped, yet food consumption continues to increase due to the rise in affluence within the country.[1] United States population has doubled from 1940 to 1972, but the national beef consumption has tripled.[2]

FOOD AND AFFLUENCE

In the first months of 1973 the first sign of global food shortage appeared as food prices rose in response to an intense increase in demand for food or food-production resources. This was the result of three factors:[3]

- long-term agricultural trends
- the short-term situation
- a condition of generalized inflation

PRICES RISE

World harvests from 1967 to 1970 were generally large with sizeable increases each year. In 1971, the developed countries maintained this trend; but the developing part of the world produced only a small increase. The 1972 harvest in developing countries represented stagnant production, with no increase on the whole. The situation was made even worse by the drop in the level of production in the developed countries. This was the first year, since the end of the second world war, that world agricultural production had declined.[4] At the same time, the world population grew by seventy-five million people. This increased demand for decreased resources greatly increased their price.

LONG-TERM TRENDS

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[1]Lester R. Brown, "Population and Affluence: Growing Pressures on World Food Resources", Overseas Development Council Development Paper 15, September 1973, p. 10.

[2]Lester R. Brown, "The Changing Face of Food Scarcity", Communique on Development Issues, Overseas Development Council, No. 21, Washington, D. C., August 1973, p. 2.

[3]Simantov, op. cit., p. 7.

[4]FAO, The State of Food and Agriculture 1973, Food and Agriculture Organization, Rome, 1973, p. vii.

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SHORT-TERM ELEMENT

The main short-term elements in the 1972 and 1973 price rise were: the drop in fishmeal production; a significant increase in importation of cereals and other farm products by such countries as the Soviet Union and China; and increased demand for natural fibers such as wool and cotton.[5] The animal feed industry, which had grown up in the sixties, was greatly dependent on fishmeal for feed in pig and broiler production.[6] With the decline in fishmeal production, due mostly to the disappearance of anchoveta off the Peruvian Coast, demand rose for soya products for feed. At the same time, the disastrous cereal harvest in the Soviet Union and China resulted in substantial increase in demand for cereal and soya in these countries. The increased demand for natural fibers put a further strain on food-producing factors -- for example, land, labor, fertilizer -- from the non-food producing sphere of agriculture. The effect was, again, to increase strongly, all around, the demand for limited resources, which resulted in drastically pushing up the price of these resources and, therefore, their products.

INFLATION

The final group of factors to consider is the world-wide inflationary and monetary situation of 1972 and 1973. The increase in inflation meant an increase in the price for food. In addition, the general depreciation of currencies meant that the value of the effected money decreased which, in turn, meant the increase of prices on the world market. As the currencies of many countries depreciated in value, inflationary offsets in the form of higher prices became widespread, particularly in agriculture, and especially affecting the economies of developing countries. Such conditions raise the cost of development for these countries at the same time reducing the value of the economic assistance they do receive.

The energy 'crisis' of 1973 and 1974 also contributed to the continued rise in food prcies. Energy products play a large part in agricultural production in the roles of inorganic fertilizer, fuels, and pesticides -- all derived from petroleum products. A quarter of the world's food is grown with the help of chemical fertilizer[7], specifically nitrogen fertilizer which accounts for a half of all fertilizer used and whose production depends on natural gas as a raw material.[8] Processing and transportation of agricultural products require large energy inputs. The interruption of oil supplies combined with a tripling of oil prices caused a reduction in agricultural production.

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[5]Simantov, op. cit., p. 7.

[6]Simantov, ibid.

[7]Brown and Eckholm, op. cit., p. 114.

[8]Ibid., p. 9.

This decline in food production, combined with the higher costs of processing and transportation from increased oil prices, resulted in sharply increased prices for food and food products.

EFFECT OF HIGHER PRICES

In the richer, developed countries -- the United States, Canada, parts of Western Europe, Australia, New Zealand, and the 'La Plata' countries of Latin America -- most people can still pay the increased prices and governments can intervene to provide relief (for example, through subsidizing programs). Even the 'in between' nations can manage well enough despite numerous obstacles and limited resources. Those who really get hurt are the "ordinary people" in the developing countries -- Asia, Africa, and most of Latin America -- whose governments rarely have sufficient resources to subsidize food prices. The result is wide-spread suffering. While the average American family needs to spend only 21.7 per cent of its income on food[9], in many developing countries families must spend a majority of their income on this one need. If the problem of world food shortage is allowed to continue as is, the problem will intensify, affecting more and more people to a greater and greater degree in larger and larger areas of the globe.

FOOD RESERVES

During the period after the second world war and up to the 1960's, two types of food reserves were available to alev te much of the suffering in the time of shortages. One was the grain reserves of principal exporting countries -- mainly the United States, Canada, Australia, and Argentina. During this time, the accepted theory was that consumption would continue to increase by 2.5 per cent annually and that, therefore, world grain reserves should too.[10] Since 1960, however, consumption has been increased by approximately one third and reserves have decreased due to food crises in 1966 and 1967, and again in 1971 due to corn blight in the United States. The 1973 food shortage again required use of reserves.

Another major factor in the food reserve equation was the U.S. cropland kept idle under the government's farm program. However, in early 1973 the decision was made to allow greater cultivation of at least two thirds of this land than was allowed in the crises of 1966/67 and 1971. In 1974, the government announced that no more payments would be made for keeping cropland idle. This meant bringing approximately one seventh of the U.S. cropland (about fifty million out of

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[9]According to The American Almanac: The U.S. Book of Facts, Statistics and Information, prepared by the Bureau of the Census, U.S. Department of Commerce, 1975.

[10]Oxfam of Canada, Development of Agriculture, op. cit., p. 2.

350 million acres) back into use -- a process which takes approximately 12 to 18 months.

Characteristic of the twentieth century, especially in the sphere of food supply, is the widening gap between developed and developing countries in the availability of resources. The population of the developed countries makes up less than thirty-three per cent of the world's population. It uses, however, a disproportionate amount of the world's wealth. This is due partially to the degree of development in this portion of the world compared to the rest and partially to its control of international markets.[11]

As in resources availability, there is a sharp and widening gap in the quality of diets (and, therefore, of life) between the developed and developing countries. In vast areas of the world the population lives on a marginal basis, almost totally dependent on local climate and crops to keep away famine. In contrast, countries that have developed on the Western Model[12] consume many times the minimal basic food requirements.

DISTRIBUTION INEQUITY

These conditions represent two ends of the pole. There are many gradations between the 'least-haves' and the 'most-haves' both between and within countries. Within developing and developed countries, there are those representing extremes as well as different levels in between. The problem, therefore, is not simply a shortage of food, but also one of inequity of distribution.

Approximately eighty per cent of the world's total food supply comes from one source -- grain. Cereal grains provide about seventy percent of the protein of people in developing countries. Grain consumption is, therefore, an excellent measure of diet quality. In North America, the average person consumes approximately one ton of grain per person a year -- about 150 pounds per person is consumed directly, the rest is indirectly consumed as meat, milk and eggs. In many developing countries less than 400 pounds per person is consumed, most of it directly.[13]

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[11]Barbara Ward and Rene Dubos, in Only One Earth, estimate that the developed world uses about seventy-five per cent of the world's resources. Further, they claim that the U.S. alone uses over thirty per cent.

[12]This includes the Communist Bloc countries, Australia, New Zealand, and Japan.

[13]Brown and Eckholm, op. cit., p. 38-39.

The effect of unequal resource distribution, when it contributes to hunger and malnutrition, can be measured in human terms as well. The effect, as discussed before, is on physical and mental health and growth. It is also on life-expectancy. For example, life expectancy for a man in the United Kingdom averages 68 years, for a woman it is 74 years; in Kenya the averages for both men and women are approximately 40 to 45 years.[14] The individual in the developed country can expect to live not only a more fulfilled life, but a longer one too.

[14] Oxfam - Workers Education Association, The Hungry Millions: A Textbook on World Development, Oxford, England, p. 4.

QUESTION II

WHY IS THERE HUNGER?

WORLD FOOD SHORTAGE AND HUMAN DEVELOPMENT

"The minimum requirements for human development are sufficient availability of life-essentials to assure physical and mental health, and sufficient opportunity for each human to realize his potential."[1] Malnutrition, inextricably associated with global poverty and illiteracy, is a major obstacle to human development.

In countries with nutritionally inadequate diets, the average income level per person is invariably less than the equivalent of $400 a year.[2] An increase in the per capita income of the poor would generally mean an increase in the amount of income spent on food and in the quality of the food bought. There are exceptions to this generalization. The move from rural to urban areas, for example, often is reflected in increased income. At the same time, however, the cost of food (as well as housing, clothes, and transportation) also increases. In addition, the "free wild foods" of the rural areas are no longer available.[3] Nor does the ability to buy better quality food necessarily coincide with the choice to do so. Extra income may go to more "status" foods such as the purchase of commercially polished rice. INCOME DISTRIBUTION

Inequitable income distribtuion is the result of inequitable political, social, and economic policies. The improvement of one position generally requires the improvement of the others.

The educational need involves three areas: basic literacy, health, and technical and scientific instruction. In Africa, EDUCATIONAL NEEDS

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[1]Wilmer H. Kingsford, "Developmentology: The Study of Global Systems and Human Development", International Development Review, volume XIII, number 2, 1971/2, p. 17.

[2]Lester R. Brown, "Why Hunger?", Communique on Development Issues, No. 9, Overseas Development Council, p. 1.

[3]Alan Berg, The Nutrition Factor: Its Role in National Development, Washington, D.C.: The Brookings Institution, 1973, p. 45.

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Asia, and Latin America, approximately ninety per cent of the farmers are illiterate.[4] An uneducated public cannot readily understand problems that are not of visible, immediate, and local impact.[5] Ignorance and superstition are major factors in occurances of deficiency diseases. Those ignorant of the value of essential foods and the fact that nutrients are lost in preparation and cooking, may innocently breed malnutrition. In addition, some foods are avoided due to superstition. Finally, farmers must be informed in order to make intelligent decisions for the use of the soil[6] and to make the most of development programs.

Planning education for better nutrition means devising programs and providing materials and personnel for the dissemination of this information to the people. This can range in scope from person-to-person exchange to mass media communication. To be effective, such programs must take into consideration local ecological, social, and cultural attitudes of the regions involved.

POPULATION GROWTH

Population growth represents another link in the malnutrition-poverty-illiteracy chain. Under conditions favorable to human development, population growth tends to take care of itself at a modest or replacement rate of manageable proportion. Such is the case in most developed countries, as well as in favored segments within a national society. Under unfavorable circumstances, population growth becomes irrational. Given an existence of hopeless, futureless despair, reproduction is absolutely basic to the instinct to survive.

Malnutrition, population growth, income distribution, and education maintain interrelationships in constant flux between roles of cause and effect. It is often difficult, if not impossible, to ascertain which factor is responsible for another. It is important to stress this point, in order to discourage an outlook that tackling only one aspect of this problem within a 'developed' context will provide far-reaching aid to developing areas. The problem must be viewed and attacked as a whole if the result is to be positive and permanent.

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[4]Oxfam of Canada, Development of Agriculture, op. cit., p. 7.

[5]George J. Harrar, Strategy Toward the Conquest of Hunger, New York: The Rockefeller Foundation, 1967, p. 50-51.

[6]Ibid.

The responsibility for world hunger belongs to no one factor or set of factors. Rather, the issue is the result of many complex and multidimensional problems affecting every level of human society. These problems fall into three main categories which determine human development: the role of nature, the role of agricultural production, and the role of government policy. It is essential to remember that these are not static divisions, but dynamic realities in a state of constant intra- and inter-reaction. The following discussion sections will deal with human development and each of its determinants as a separate factor of the world food shortage issues, dealing with the basic problems and policies needed for each.

The reader should always be aware that the divisions are aritifical constructions. They have been separated in an attempt to make the recognition of each determinant and its role in the problem simpler to grasp.

WORLD FOOD SHORTAGE:

NATURE'S ROLE

Nature controls agriculture more than it does any other industry placing an extra burden on those who would make their living from it. One of the most recent examples of its power can be seen in the six year ordeal of the Sahelian region of Africa.[1] From 1968 to 1973, this area suffered a drought that resulted in an estimated 100,000 human deaths. Forty per cent of the area's goats, sheep, cattle and camels were also victims. In 1974 good spring rains came and the fall harvest returned to ninety per cent of its pre-drought yield.[2] But the tragedy of the six dry years -- in human and agricultural production terms -- will take more than a season's harvest to mend.

ARABLE LAND

One of the major problems facing the world food supply is the availability of arable land. Twenty per cent of the earth's surface is covered with snow or ice, another twenty per cent is made up of mountains or plateaus too rugged or too high for farming, twenty per cent more gets too little precipitation, and another ten per cent has little or no soil suitable for supporting agriculture.[3] Of the remaining thirty per cent, only about a third is used for cropland. Almost twice as much land is used for grazing.[4] This land tends to be at higher elevations, steeper, rockier, and drier.[5]

SOIL QUALITY

Topsoil is one of the essential elements in the arability of an area. This layer, from seven to twelve inches deep, is here plant nutrients are at a relatively critical distribution balance. It takes approximately 7,000 years to

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[1]The Sahelian region includes the countries of: Chad, Mali, Mauritania, Niger, Senegal, Upper Volta.

[2]David Shear and Roy Stacy, "The Sahel: An Approach to the Future", War on Hunger, Agency for Internation Development, May 1975, p.7.

[3]Oxfam of Canada, Development of Agriculture, op. cit., p. 3.

[4]Brown and Eckholm, op. cit., p. 77.

[5]Ibid.

build up this topsoil layer, an extremely fragile resource base essentially dependent on climatic cycles and changes in the chemical composition of the earth.[6] Man can destroy it, either by overuse or misuse, in only a comparatively few years. Every year, sever soil erosion, caused by such misuse as improper cropping systems, overgrazing and forest destruction, claims large amounts of cropland. In Asia, the Middle East, North Africa and parts of Latin America, ecological crises have been caused by increased land clearing, cultivation and grazing in an attempt to meet the ever-growing demand for food by an ever-growing population. A U. S. government study reports that the Sahara Desert expands at approximately thirty miles a year -- partially because of overuse of its adjacent land.[7] In these developing countries, the principal method of soil care is to allow an area to lie fallow and regenerate its own nutrients. As the population increases, the amount of land that can be left fallow decreases. Because they are artificially produced, inorganic fertilizers can be made much more specific to each crop's needs. However, these chemicals must be used very carefully, for the soil, especially the more delicate types of the tropical zones, has a limited capacity for absorption, and overuse can spell disaster for both soil and water polluted by fertilizer run-off. Man's inability to plan ahead or predict the results of the 'artificial' methods of agriculture (e.g., irrigation, use of chemical pesticides), many times results in fiasco. In the United States in the 1930's, one of the causes of the dust bowl era was the sever soil erosion from plowing marginal land. In the USSR, a recent massive effort to farm 100 million acres of virgin land resulted in sever wind erosion, causing the same "dust bowl" effect. In the poorer countries, such as India and Pakistan, millions of such unproductive acres have been abandoned and the rural people have fled to the already over-crowded cities.

EROSION

The most important factor in soil-formation is rain. Fresh water is essential to agriculture because it takes nutrients required for building tissues up to the plant. Farming claims ten per cent of all water used. Each pound of dry plant produce requires 400 to 500 pounds of water.[8] Although fresh water is essential to farming, it is also a limited resource. Just as man has been responsible for the unwitting destruction of arable land, he has also been careless with the water he needs to obtain food. Rapid withdrawal of water in lakes, rivers, streams, and underground sources for agricultural use is taking place in many parts of the world.

POLLUTION

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[6]McHale, op. cit., p. 18.

[7]Brown and Eckholm, op. cit., p. 46.

[8]McHale, op. cit., p. 28.

Water eutrophication has often resulted from the build-up of the nutrient content in streams and lakes from the run-off of fertilized land. Left unchecked, this results in the destruction of fish life, and eventually, the transformation of a body of fresh water into a swamp. In many areas, however, available water would mean the extension of the world's arable land.

Besides useage as fresh water in conventional agriculture, man derives food from both fresh and salt water by fishing and hunting aquatic animals. Indiscriminate sewage and industrial waste dumping, discharge, and 'spills' from tankers and ocean drilling rigs have resulted in considerable contamination of fishing and wildlife waters, particularly on key coastal shelves. Radio-active waste disposal, dumping of obsolete chemical and biological warfare compounds and even old sea mine field have also helped to make some coastal waters unsafe.[9] Further, overfishing and hunting have reduced catches and brought many ocean species near extinction.

The United States is not immune from these hazards. It is lucky in that its global position provides it with a diversity of growing seasons and, therefore, a diversity of agricultural produce and methods available for use. But nature and man's neglect have taken their toll. In the eastern United States, for example, soil erosion in the past 300 years has been more destructive than it has in North-Central Europe since the beginning of Christian time.[10] Unregulated and unintelligent use of water, either by under-application or over-application, has caused waste and possible ruin of soil. The result is eroded lands, the creation of marhlands bordering salt waters, and the depletion of wildlife.

Weather, to the farmer, is an enigma and a handicap. Droughts and unfavorable weather conditions were the main cause of the widespread poor harvests of 1972, making 1973 the most difficult world food supply year since the end of World War II. Better knowledge and understanding of the atmosphere and its components, and increased and improved techniques of influencing rainfall, such as cloud-seeding, would greatly aid man in his search for food. Such techniques should be approached with extreme caution, however, with consideration given to global effect and other possible damaging occurrences. Increased irrigation would open up more land for use. But, here too, a warning note must be sounded. Too often, man has jumped at what seems to be the modern and technological answer to his problems without first investigating all facets of the problem and the cure, and without providing a well-

WEATHER

NEED FOR PLANNING

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[9] Ibid., p. 26

[10] Edward Higbee, The American Oasis: The Land and Its Uses, New York: Alfred A. Knopf, 1957, p. 35.

thought-out program of action. An excellent example of this is the disaster caused by an unexpected side-effect from the spread of modern irrigation in Egypt and other river valleys in Africa, Asia, and South America. The dams provided the farmer with water-covered fields for his crops -- this was planned. What was not planned was the great increase of schistosomiasis, a debilitating intestinal and urinary tract disease caused by the parasitic larvae of a blood fluke that burrows into the flesh of men who work in such water-covered fields. Other side-effects were equally harmful. The fault was not in providing irriation, but in neglecting to formulate a well-thought-out system by which to provide irrigation.

A shift of attention is necessary from focusing entirely on increased food production to more emphasis on the ecological consequences of this increase and methods by which to cope with them. Such a shift would be reflected in increased research on such problems as a substitute for DDT which, although an effective pest control, is ecologically harmful. Another example would be improvement of both the management of the soil's use and the maintenance of its fertility. Modern methods have included heavy fertilization, improved seeds, insecticides, and supplementary irriation. These methods, however, could be detrimental to the more delicate soils of many developing countries. They also represent a considerable expense for the small farmer. Traditional methods of soil maintenance and management of these countries represent cultural responses to the conditions of soil and climate peculiar to the area. For example, nomadic tribes, often looked down upon as symbols of 'backwardness', strictly follow the grazing routes and territories and adapt their lives closely to the basic necessities.[11] Their constant moving allows these grazing areas to revitalize themselves. If they were to stay in one place too long, overgrazing would result. Part of wise agricultural planning would mean observing the value of the old systems, evaluating their utility, and adapting their successful factors into the new system. Without good planning, man's reliance on the too-often broken benevolence of nature increases.

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[11] Jonathan Holliman, The Ecology of World Development, Voluntary Committee on Overseas Aid and Development, June 2, 1973, p. 11.

WORLD FOOD SHORTAGE:

THE ROLE OF AGRICULTURAL PRODUCTION

Agriculture is the world's largest industry.[1] It supplies food, clothing, the basic necessities of life, and raw materials for other industries. In the developing countries, agriculture is the basis for everything else. Up to eighty per cent of the populations in these countries are involved in agriculture. In India, seventy per cent of the people depend on agriculture for their livelihood; in Malasia, fifty-five per cent do; in Thailand the percentage is seventy-eight.[2] In comparison, few in developed countries make their living from farming. In the United States under seven per cent are involved, in the United Kingdom the number is less than five per cent.[3]

NEEDED IMPROVEMENTS

The factor of agricultural production in the problem of world food shortage includes the need for improvement of: seeds, farming method and management, storage and transportation methods, and production of artificial foods. Within the area of conventional agricultural methods, there are two ways to expand world food supply: expanding cultivation area and increasing area yield. With few exceptions -- e.g., in the interior of Latin America and parts of sub-Sahara Africa, most arable land in the world is now being cultivated.[4] In addition, agriculture must compete with industrial and residential development and recreation and transportation systems for the use of the land. Because of the limited additional world acreage suitable for cultivation, the cheaper and easier method of expanding world food supply is to increase output per acre through the intensified cultivation of land already under use.

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[1]Oxfam of Canada, Development of Agriculture, op. cit., p. 5.

[2]Oxfam, The Hungry Millions, op. cit., p. 5.

[3]Ibid.

[4]Brown and Eckholm, op. cit., p. 8.

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MODERN METHODS

Intensified cultivation calls for the modernization of farming methods -- the application of engineering to agriculture through use of farm machinery, extension of rural electrification, and expansion of irriation systems[5] -- and intensified use of basic physical resources. Included in these categories are: adoption of more efficient means of water availability; soil improvement, management and conservation; using appropriate plant varieties, application of organic and inorganic fertilizers; and control of pests and diseases. If implemented on a world-wide basis, this would mean at least a doubling of the world food supply without the necessity of cultivatin new land.

U. S. FARMING

Such practices are well within the means of the agricultural sector in the developed countries. In the United States, for example, the last ten years have seen the "industrialization" of farming with the number of farms decreasing and their production increasing.[6] The result has been the establishment of two agricultural sectors in the U.S.:[7]

- large farms making up only twenty-five per cent of the U. S. farms, but responsible for eighty per cent of the market production
- small farms, making up seventy-five per cent of U. S. farms, but responsible for only twenty per cent of the market production.

U. S. farming has become "big business" -- a condition that promotes the use of modern farm methods that result in intensified cultivation.

FARMING IN DEVELOPING LANDS

Farming in developing countries is a different case. Agriculture is usually the domain of the small farmer with access to only a modest amount of land. His farm is generally run on the subsistence level with only marginal involvement, if any, in the commercial sector. His access to political power is limited, as is his access to the productive services and assets, and the income flows of the society.[8] Implementation of plans for modernization in developing countries, therefore, would necessitate a drastic change in the cultural, economic, political, and social systems, as well as intensive investment and/or aid -- money, materials, training -- from 'outside' as well as from within. The process toward increasingly modern methods of cultivation in developing countries would have to be slow, based on detailed and extremely well-devised and

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[5]Harrar, op. cit., p. 6.

[6]Committee for Economic Development, A New U. S. Farm Policy For Changing World Food Need, Committee for Economic Development Report, October 1974, p. 24.

[7]Ibid.

[8]Dale Adams and Walter Coward, Jr. "Small Farmer Development Strategy: A Seminar Report", Agricultural Development Council Seminar Report. Agricultural Development Council, New York, July 1972, p. 6.

thoroughly thought-out plans, involving all areas of the society in order to avoid chaos and possible disaster.

Increased production must be met with improved storage, transportation, distribution and marketing systems, for more food will mean nothing to the hungry if it cannot get to them. Subsistance farmers will not begin producing surplus crops for markets if they cannot reach the marketplace. Between a quarter and a third of all food grown in developing countries is lost due to disease or deterioration during storage. Pests, birds, rats, insects -- add to this destruction, accounting for approximately one fifth (and sometimes more) of the food grown.[9] Chemical and biological control of pests and diseases, and the use of irradiation for food preservation in storage and transit would greatly decrease such waste.

TRANSPORTATION

STORAGE

Fertilizer is essential for agricultural production. Inorganic fertilizers are used in the greatest amounts, because they can be artificially manufactured. To provide adequate world-wide food supply, available fertilizer provisions need to be increased by at least an additional thirty per cent.[10] This could mean an increase in world food by fifty per cent.[11] The supply of manufactured fertilizer, however, is limited. The increase in the price of energy products has aggravated conditions. The process of manufacturing inorganic fertilizers is energy-intensive. As energy prices rose in 1973, many new fertilizer production facilities were not built due to the huge amounts of capital required. Such construction work takes a long time and therefore shortages will continue to persist. Most inorganic fertilizer is used by the richer developed countries who can more easily afford it.

FERTILIZER

The problem of alleviating hunger does not consist entirely of improving diet quantity by getting more food to more people. It is also necessary to improve diet quality, by providing more calories for energy and more protein for the child's growth and normal development and for maintaining the adult body's tissues.

IMPROVING DIET QUALITY

Cereals are mankind's staple food, providing bulk and calories. They do not, however, have a high protein content.

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[9] Oxfam of Canada, Development in Agriculture, op. cit., p. 6.

[10] McHale, op. cit., p. 20

[11] Oxfam of Canada, Development in Agriculture, op. cit., p. 5.

Sometimes, commercial processes decrease the protein content provided by nature. The commercial flour milling process in richer countries, for example, removes the protein-rich outer husks of wheat. Abolishing such waste could increase the protein quality of wheat products. The richest source of protein is animal products. However, to rely heavily on livestock for resources for the elimination of protein malnutrition may necessitate a tripling of livestock production by the year 2000. Such increase will be very difficult to achieve. The grazing capacity for much of the world's pastureland is now almost fully used.[12] In addition, livestock production is much slower and more expensive than grain production. One cow can produce only one calf (multiple births are rare). Further, beef production requirements average more than four pounds of vegetable protein for each pound of meat protein produced. Chicken or fish production requirements are less per unit, and, yet, they are as good a source of protein as beef. Adding synthetically manufactured vitamins and other nutritional essentials to staple foods would also improve their food value.

RESEARCH

More research is needed to produce higher yields of grain and to improve their protein content. Until the 1960's, most agricultural research was concerned with the problems of developed countries or with the agricultural products that they imported, rather than with the problems of developing lands. This research was conducted mostly by the agri-business sector of developed nations. Tropical and sub-tropical agriculture is almost completely the domain of developing countries. New research, testing, and feedback is needed in this area. These could be conducted by the same agri-business organizations through new projects and adaptation of work already done in developed countries.

Research is also needed in the area of non-conventional agricultural method. Ninety per cent of the sun's energy is not utilized with today's method of farming.[13] In terms of the ratio of available solar energy to ultimate food energy production, the conventional agricultural method is uneconomic and time-consuming.[14] A better understanding of photosynthesis would achieve much. Production costs could be reduced if methods for the use of nuclear energy could be developed and applied to agriculture. Heat, light, and

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[12]Brown, Population and Affluence, op. cit., p. 36.

[13]Harrar, op. cit., p. 10

[14]Ibid., p. 13.

power would be cheaper, reducing the costs of farm machinery, transportation, and artificially produced fertilizer.

The amount of photosynthesis that occurs in the seas is several times (perhaps as much as ten times[15]) that which occurs on land. Increased aqua-culture, or sea-farming, could also do much to expand the world's food supply. Fish makes up about thirty per cent of man's total protein consumption.[16] Fish matches red meat in quality and quantity per pound of available protein supply.

FISH AS FOOD

Since 1948, the consumption of fish has increased almost all over the globe. In developing countries, fish makes up, on the average, about 16 per cent of the animal protein in diets. In the Near East, it makes up 3.5 per cent of the animal protein intake; in Asia and Africa, the amount soars to over twenty-five per cent.[17] Since the second world war, the world catch has more than tripled, the result of the combination of higher catch and less waste. This is due to superior techniques and materials for netting, tracing the fish, and processing and storage on board. In 1969, ten per cent of the world's sea surface was being fished: ninety-five per cent of this was done in the northern hemisphere near the coasts.[18] Deep sea fishing requires large boats and on-board preserving systems; whereas, off-shore fishing provides adequate resources at much less cost. The increased competition in fishing has resulted in countries claiming greater and greater off-shore limits[19]: Iceland claims fifty miles, the USSR claims twelve miles off its eastern coast, Chile claims 200 miles.
Along with the limited fishing area, only certain kinds of fish, mollusks and shell fish are sought. Only in parts of Asia are seaweed and plankton used.

The world-wide catch, in the limited areas fished, is at or near the 'maximum sustainable level' now. Fishing over this point would mean a sharp drop in catch with the necessity of a longer recovery period, if there is one at all, due to the

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[15] Ibid.

[16] Food and Agriculture Organization, Congress Participants to Discuss How to Get People to Eat More Fish, Second World Food Congress Press Release, April 1970, p. 1.

[17] Ibid.

[18] Rene Dumont and Bernard Rosier, The Hungry Future, New York: Frederick A. Praeger, 1969, p. 56.

[19] The international law of the sea has not yet been universally codified or accepted. In practice, a government has jurisdiction over as much territorial sea as it claims and can control.

much longer feeding chains in the ocean as compared with those on land. In 1969, over-fishing resulted in decline in catch, increasing competition in world fisheries, and adding further strain to land-based protein sources.

AQUA-CULTURE

To pursue sea farming as land farming, types of enclosures breeding and fattening areas and systems, weed, pest and disease control, fertilizer for boosting feed supply, and breed selection for type, taste and economic food conversion will be necessary. To increase use of fish for food and protein supply, man will have to explore and exploit food potentiality of the seas, and develop marine biology to the state that techniques are available to increase concentration of plant and animal products. Local fresh and salt water aqua-culture experiments have been successful in Norway, Israel, China, Germany, the USSR, Japan, Australia, and the United States.[20] However, there are unresolved technical problems and, as yet, there is no immediate prospect that aqua-culture will provide more than a small per cent of the world's fish supply.

As on land, the resources of the seas are limited and must be used wisely and carefully. With added research, the use of world fisheries can be expanded and improved. A further agricultural use could be made of the sea if an economical desalinization process could be developed to provide an unlimited fresh water supply that could be transported great distances for farming uses. But, because of resource limitation, the seas alone cannot solve the problems of world protein or food shortage.

OILSEEDS

Another form of non-conventional agriculture is the use of oilseeds -- soy beans, ground nuts, and cotton seeds -- as a source of protein. In the United States, soy bean products have been used as meat-extender in school feeding programs and are available in many flavors and forms in health food stores. A soy bean product is sold successfully in Hong Kong as 'milk', and in wealthier parts of Southeast Asia it is marketed as a soft drink.[21] Soy bean oil is used as a butterfat substitute. In East Asia, soy bean is consumed directly as food. As animal feed, about one half of the world's soy bean production is used as a major high-quality protein source for livestock and poultry. Scientists have yet to make a breakthrough in increasing per acre yield of soy beans. These plants have not responded to nitrogen fertilizer to increase yield per plant; therefore, to produce

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[20] Brown, Population and Affluence, op. cit., p. 29.

[21] Oxfam, "Foods for the Future", Information from Oxfam, May 1, 1973, p. 1.

more soy beans, one must plant more soy beans.

As a category, oilseeds do not have the full range of amino-acids found in animal protein. As a whole, these seeds are inedible in their raw state, and must depend on modern technology for the fullest and widest use.

FISH MEAL

Using fish meal for human consumption began in Germany and Scandinavia in the 1930's. More recently it has started in the United States, Canada and Sweden.[22] This product provides a use for the types and parts of fish which are not acceptable in their natural state -- including bones, fins, and scales -- and which are more persihable in transport. It accounts for one third of the world's fish catch. It is also used as animal feed and fertilizer, mainly in the developing countries, but also in the United States, West Germany, the United Kingdom and the Low Countries. The chief problem is the cost of manufacture.

SYNTHETIC FOODS

Synthetic, single-cell protein food, produced by chemical and controlled biochemical means, represents yet another example of non-conventional agriculture. These high-protein materials have various origins: yeast, bacteria, fungae, and algae. Some, such as algae products, have been used as human food for years. The Incas used a strain of algae, now lost to civilization, to make food from the Andean lakes.[23] Today, the algae-oriented foods are used for human consumption in Southeast Asia and Japan. Approximately 400,000 tons a year -- some merely harvested, others cultivated -- meet the Japanese demand.[24] Other synthetic, single-celled foods are produced by new high-technological methods that 'grow' organisms on waste or cheap materials, producing proteins. These have been chiefly used for animal feed. The first approach in this field was in animal feed production, resulting in reduced feed prices. Continued research and experimentation can make these methods useful for human food supply, too. Problems appear, however, in areas of production costs, distribution, and, perhaps most understandable, in marketing the products.

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[22] Ibid, p. 2.

[23] Ibid.

[24] Ibid.

WORLD FOOD SHORTAGE:

THE ROLE OF GOVERNMENT POLICY

Agricultural development depends a great deal on government policies of both developing and developed countries toward production, trade, and aid. Overlaying western models of agricultural development on developing countries may not result in an improved condition because they are based on assumptions -- economic, political, social and cultural -- foreign to those regions. The kind of government agricultural policy needed is that which can halt price and income instability, at the same time assuring adequate and steady supplies.[1] This can be done successfully by analyzing each country's development condition and working within that context.

FOREIGN EXCHANGE FUNDS

A chief requirement of development is adequate resources of foreign exchange. These funds are necessary for the purchase of the factors of agricultural development, including: machinery, road and air communications, transportation and storage facilities, irrigation systems, telecommunication and meteorological services. They also provide the consumer products which the developing countries cannot provide themselves and, therefore, must import, and the capital equipment needed for industrialization.

TRADE

Foreign exchange is made available through trade and aid. Agricultural products make up eighty to ninety per cent of the developing countries' exports.[2] Developing countries are responsible for more than sixty-one per cent of the overall world agricultural trade -- only about nineteen per cent from exportation, while over seventy-five per cent from

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[1]Council for Economic Development, op. cit., p. 5.

[2]If the country has oil or minerals to export, and relatively few of the developing countries do, the average is forty per cent. Food and Agricultural Organization, "Developing Countries Trade Will Be a Key Issue Before Second World Food Congress", Second World Food Congress Press Release, April, 1970, p. 2.

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importation. Growth of demand for developing countries' exports is slow. Consumption of these products in developed countries protect domestic production, restricting agricultural imports. Further advantages of the developed countries include: large-scale production units, higher productivity per unit, and better organized market arrangements.[3]

IMPROVING TRADE

The primary action taken by the developing countries to increase their share of the world's export trade should be to expand their exports to the rich markets of the developed industrialized countries. The secondary action should be the expansion of trade among the developing, lower-income countries. The latter would provide a smaller outlet for trade than that with developed countries, but would, nevertheless, be a key economic sector. This will mean using to the hilt existing export opportunities for specific commodities, establishing dynamic long-range export promotion planning, and improving processing techniques and systems. International organizations can be of help in an advisory capacity. Regional self-sufficiency by developing countries will cut costs of importation in terms of foreign exchange. Finally, increased employment will be stimulated in these countries, thereby raising the level of income.

USING EXISTING RESOURCES

The economic use of already existing resources is of strictest importance. Forestry offers a potential earner of foreign exchange in developing countries. From 1950 to 1967, the demand for wood doubled, due to increased per capita consumption of wood products through pulp and paper products wood-based panels, plywood and fiberboard.[4] Most of the largest and richest forests in the world are the tropical rain forests of the 'Third World' countries.[5] Most of these remain unexploited or poorly managed. This offers the possibility of a large new industry.

MANAGEMENT AND LAND REFORM

The best use of already-existing resources also depends on agricultural management and on land reform. Land reform includes at least four administrative operations: change

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[3]Food and Agriculture Organization, Five Keys to Development, Rome: Food and Agriculture Organization, 1970, p. 30.

[4]Food and Agriculture Organization, Modern Forestry Will Bring Money and Food to the Developing World, FAO Second World Food Congress Press Release, Rome, May 1970, p. 1.

[5]Ibid.

in tenacy rights ownership; issuing land titles and enforcing contracts; transferring funds to landlords as compensation and collecting tenants' rents and new purchasers' payments and adjudicating disputes over boundaries, inheritances, and rights.[6] These operations can be carried out in three ways: centralized in the national bureaucracy, decentralized in new or already-existent agencies, transferred total or partial responsibility to local authorities. The third method has proved the most successful of the three.[7]

MARKET AVAILABILITY

Problems arise in the shape of market discrimination through tariffs and 'favorite nation' policies, and inadequate technology in developing countries for processing goods and for providing the quality acceptable on world markets. To achieve the necessary trade improvement requires cooperation and aid by more prosperous, developed countries. Negotiations cannot be begun by only one, or a few governments, but must have an international forum involved in hard bargaining. Otherwise, the result will be yet another statement of 'good will' and little more.

AID

Support through the transfer of developed countries' food surpluses to developing countries is not sufficient. Such policy attacks the problem on only very short range and superficial terms. Assistance must take the form of aid to developing economies to achieve increased production and national stability. The results of these long-term policies are mutually beneficial, for the developing countries represent the greatest potential food supply at the least cost. What is needed is proper organization and economic incentives, fertilizer, water, new seeds, and other necessary agricultural factors. When advancing aid programs, however, it is essential to operate within certain boundaries. In planning, the following should be kept in mind: the country's cultural patterns, the difference between need and available opportunity, and the recognition that a workable analysis takes time -- long-range achievements should not be sacrificed for speed.[8] In addition, certain assurances must be made to the people of the various countries. They must be convinced of the value of the program, the effectiveness of the plan of action, the potential for training their own citizens, and the permanency of the program's effect.

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[6]John D. Montgomery, Allocation of Authority in Land Reform Programs: A Comparative Study of Administrative Processes and Outputs, Agricultural Development Council Research and Training Network Reprint, March, 1974, p. 2.

[7]Ibid.

[8]Harrar, op. cit., p. 18-20.

QUESTION III

WORLD FOOD SHORTAGE:

WHAT IS BEING DONE?

Economic progress of the United States grew from the development of trade and the "largely spontaneous" private exploitation of science and technology.[1] The ruling philosophy, like that of many of the now developed countries, was one of 'laissez faire'. In the beginning stages, government did not devise central development plans. Over time, as societies became more complex, governments took larger roles, establishing and regulating systems for popular education, public support of scientific research, banking, transportation and communication facilities, and economic coordination.[2]

A fundamental source of increasing inequity in world agriculture has been the lag, in developing countries, in shifting from a natural to a science-based agriculture.[3] This shift takes time, as it did with the now developed countries. It cannot be achieved by simply overlaying modern technology on traditional cultures. Change must be brought about slowly after considerable study of and cooperation with societies' environments and political, social, and cultural systems.

MAKING CHANGES

Assuming the United Nations projections, the population of developing countries will have gorwn by between 1,000 and 2.500 million by 1985.[4] This means that food supplies must be increased by at least eighty per cent.[5] This increase is exclusive of diet quality or quantity improvements. To be effective, the necessary development must

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[1]Herman Southworth and Bruce Johnston, Agricultural Development and Economic Growth, Ithaca, New York: Cornell University Press 1968, p. 1.

[2]Ibid, p. 1-2.

[3]Vernon W. Ruttan, "Induced Technical and Institutional Change and the Future of Agriculture", Agricultural Development Council Reprint, December 1973, p. 5.

[4]Centre for Economic and Social Information, "Population", Development Forum, Development Forum Supplement, November 1973, p. 4.

[5]Ibid.

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include both industrial and agricultural progress. To attempt one without the other, would require continued heavy importation, defeating attempts at self-reliance and building foreign exchange reserves. Effective results also necessitate the cooperation of developing and developed countries for the most efficient use of planning and practice.

PAST POLICIES

Past policies of aid and assistance have included the exchange of personnel, information and material; providing necessary areas with the surplus stocks of developed countries; and the institution of an international testing program involving various crops that has led to increased food production. These programs have been conducted by both private and public organizations. Generally, programs of the past have been essentially concerned with providing needed food without attempting to tackle the sysyem's basic flaws and injustices at the root of the hunger problem.

The following section deals with programs to affect food supply and agricultural development, their success and their failures. It also discusses the UN World Food Conference.

THE GREEN REVOLUTION

AND

AGRICULTURAL RESEARCH PROGRAMS

The Green Revolution of the 1960s was "the combination of new cereal technologies and production-oriented economic incentives".[1] It was, essentially, an attempt to modernize agriculture in developing countries. The cereal varieties of the developed countries proved unsuitable for the different soils and climates of the developing countries; therefore, in 1967, after twenty years of research, new and carefully selected rice and wheat hybrids were produced.[2] These hybrids could safely absorb up to 120 pounds of nitrogen fertilizer per acre, meaning quicker maturation and greater productivity.[3]

HISTORY

The ground-breaking process began in 1943 when the Mexican government invited the Rockefeller Foundation to devise a program -- the Cooperative Agricultural Research Program -- to stimulate that country's agricultural production. This privately funded operation's results included: widespread improvement of corn and bean varieties, the increased production of potatoes, the introduction and widespread growth of sorghum and soy bean, and the increased growth and addition of vegetables in the Mexican diet. Throughout this program, young Mexicans received instruction which enabled them to expand this agricultural improvement to new areas and to continue to train new people.

NEW SEEDS

The breakthrough came when the Rockefeller Foundation team developed a high-yielding dwarf wheat with three essential qualities: a fertilizer responsiveness, lack of sensitivity to photoperiods (length of day-light), and early maturation.[4] Given necessary amounts of fertilizer and water, and appropriate management, the resulting yield could be as much as doubled. The lack of sensitivity to photoperiod meant that the wheat could be planted all over the world, from the tropics to the temperate zone. The combination of early maturation

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[1]Brown, Population and Affluence, op. cit., p. 16.

[2]Ward and Dubos, op. cit., p. 157.

[3]Ibid.

[4]Brown and Eckholm, op. cit., p. 134.

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and lack of photoperiod sensitivity meant the chance for multiple cropping given sufficient water supplies. After the Rockefeller Foundation's success with dwarf wheat, the Ford Foundation and the Rockefeller Foundation established the International Rice Research Institute in the Philippines in 1960 to breed and hybrid rice with the same qualities. This attempt was successful in a few years with the development of IR-8 rice.

EARLY EXPERIENCE

The use of these new seeds spread rapidly where appropriate water, fertilizer, and price incentives were available. Successful effects began to be seen in Afghanistan, Ceylon, Indonesia, Kenya, Malaya, Morocco, Thailand, Tunisia, and Turkey. Definite successes were achieved in India, Pakistan, and the Philippines. From 1965 to 1972, Indian wheat production expanded from 11 million to 27 million tons -- an increase in a major crop unmatched by any other country in history.[5] This growth resulted in exceptional cereal reserves, making India self-sufficient in cereals in 1972. However, due to the poor monsoon of 1972, India returned to the world grain import market. The Pakistani wheat production increased so greatly that it began to export wheat. In the late 1960's, the Philippines became self-sufficient in rice production, thanks to the combined Ford and Rockefeller Foundations' program.

The Green Revolution has obviously had many beneficial effects. In the poorer areas of the world, it has meant a significant local increase in food production. It has enabled developing countries to implement quickly the agricultural research that developed countries took decades to complete. The increased income, resulting from the success in the Green Revolution, has stimulated industrial growth. Properly managed, it has also meant an increase in employment.

The list of benefits of the Green Revolution, however, are generally qualified statements. The improved seeds were successful, but they included only wheat, rice and maize. Little or no effect has been made on sorghums, millets, barley, pulse, and legume, which are essential to the mainly cereal-based diets of the developing countries.[6]

Generally, it was the large farmer who, since he could better afford the new seeds, derived the benefits from them. In and of itself, this was not necessarily a 'negative' result. It created a stage of development seen in the Western countries

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[5]Ibid., p. 137.

[6]Norman E. Borlaug, "The Green Revolution, Peace and Humanity", Population Reference Bureau Selection, No. 35, Population Reference Bureau, Inc. 1970, p. 2.

during the Industrial Revolution -- a large rural segment unable to participate in large-scale farming methods, went to the urban centers to live, supplying budding industries with needed labor. Unfortunately, in developing countries, there is not enough urban employment available to absorb the shift from rural to urban life.

Although the new seeds have provided improvements vital to success in developing countries, they have created their own problems. Plenty of water and fertilizer are prime requisites for the seeds, but these resources frequently are in short supply in developing countries. Because of the necessity for intensive fertilization and irrigation, and dense planting, the new seeds are natural targets for epidemic plant diseases when such necessities are not available. Finally, the development of new seeds, although effective in agricultural production, has tackled only one of the many aspects of food shortage. It does not provide an approach to the socio-economic problems which present such a difficult obstacle to development. To do this requires adjustment of or addition to existing institutions between grower and ultimate consumer. A much more complex and interrelated approach is needed affecting urban and rural sectors to spread the potential success of the Green Revolution.

INTERPRETING THE RESULTS

As a whole, the less developed countries have made relatively little progress in increase per capita cereal production. Nor is there expectation of rapid rise in the 1970's due to the high costs of irrigation facilities, additional fertilizer, and management abilities. However, the Green Revolution cannot, by any means, be termed a failure. Locally the new seeds have expanded cereal production, halting the deteriorating trend in per capita food production in many less developed countries. Further, it must be emphasized that the Green Revolution is not, in and of itself, a movement open to success or failure. Rather, it is a tool, as is irrigation or mechanized plowing, to be used for increased production of the food supply. To have effect on the problem of development it must be joined with well thought out and devised programs of land reform, more lenient credit criteria, increased availability of extension services, etc. Although it has not "solved" the problem of food shortage, the Green Revolution has had the effect of 'buying time', giving man a breathing space to tackle the roots of the problem.

AGRICULTURAL RESEARCH

Agricultural research to expand production and improve plant quality continues under many different auspices; among these are:

- national and state Departments of Agriculture and their experimental stations
- Schools of Agriculture at major universities
- foundations and private organizations

Discussion of two research areas -- the international effort through the Consultative Group on International Agricultural Research (CGIAR) and the work of the agribusiness sector -- highlight the contrasting approaches to agricultural research.

INTERNATIONAL EFFORTS

The Consultative Group on International Agricultural Research (CGIAR) was formed in 1971, sponsored by the World Bank, the United Nations Food and Agriculture Organization, the UN Development Program, thirteen governments[7], three regional development banks[8], the Commission of European Communities, three private foundations (Ford, Rockefeller and W.K. Kellogg), and the International Development Research Centre (an autonomous Canadian Organization). Its purpose is to achieve an essential transformation of tropical agriculture through cooperative efforts of established research centers. This includes the development and promotion of:[9]

- new seeds
- new and more efficient agricultural practices such as knowing when and how much to plant and at what depth and spacing; when and how much to irrigate; when to fertilize, what kind to use and how much, and weed and pest control methods
- government services and policies such as credit and marketing arrangements, technical advice, and storage facilities
- scientific research and testing.

Funds for this international agricultural research come from the sponsors of the Consultative Group.

CGIAR CENTERS

CGIAR is made up of eight centers:

- International Rice Research Institute, Los Banos, Philippines.
  This center is one of the two oldest international centers and the prototype for the others.

- International Maize and Wheat Improvement Center. El Batan, Mexico.
  This center's work in new strains of wheat and

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[7]Australia, Belgium, Canada, Denmark, France, West Germany, Japan, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom and the United States.

[8]African Development Bank, Asian Development Bank, and the Inter-American Development Bank.

[9]Consultative Group on International Agricultural Research, International Research in Agriculture, Consultative Group on International Agricultural Research, New York, 1974, p. 14.

high lysine maize has met with a great deal of success, having a great effect on developing countries' production.

- International Institute of Tropical Agriculture. Ibadan, Nigeria.
  This center specializes in agriculture for the humid tropics, mostly in Africa, giving special attention to tropical soils.

- International Center of Tropical Agriculture. Palmire, Colombia.
  Specializes in effective agricultural methods for lowland tropical areas of the Western Hemisphere.

- International Crops Research Institute for Semi-Arid Tropics. Hyderabad, India.
  Stress here is on farming systems and water conservation techniques of special significance to small-scale farmers in hot, water-short areas.

- International Potato Center. Lima, Peru.
  The speciality at this center is work to increase potato cultivation in developing areas and expand the potato's range of adaptation to new areas, including the tropical lowlands. This center's most recent success (August 1975) was the development of a potato with thirty-one day growth period, a fraction of the time usually required. Potatoes are important in developing areas as a source of calories and protein. This new development would enable the cultivation of the potato in tropical areas.

- International Laboratory for Research on Animal Diseases, Nairobi, Kenya.
  The main emphasis here is on immunological methods for controlling two major animal diseases: East Coast fever and trypanosomiasis.

- International Livestock Centre for Africa. To be located in Ethiopia.
  This center is concerned with the increase of animal production in developing areas through improved methods of animal husbandry.

These centers share essential characteristics:[10] CENTERS' DESCRIPTION

- though situated in one particular place, they are international in focus

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[10] Ibid., p. 12.

- their senior staffs represent the best scientists without regard to nationality.
- research program facilities are enriched through the accepted responsibility of the host country to do all it can to aid the center's development
- strong linkages tie a center and its research to national and regional research institutions throughout the world
- the centers' responsibilities include training research scientists and production workers
- most centers are near a university with joint scientific training programs
- research mostly involves one food crop and the development of farm systems
- the centers' responsibilities includes the development of outreach programs.

CGIAR also supports the regional rice research program of the West Africa Rice Development Association, an international organization of West African governments.[11]

HOW CGIAR WORKS

The governing body of CGIAR consists of five representatives, serving two year terms, from the five major 'developing areas' -- Latin America, Africa, Asia and the Far East, Southern and Eastern Europe, and the Middle East. Each region designates two countries which alternate as members of the governing body. The World Bank provides the Secretariat for the CGIAR.

Progress reports from the centers and their needs for new research serve as the bases for funding determination. Each Group member may give funds to some of the centers and not to others, but most centers have several donors. No center receives funds from all donors. Proposals must be submitted through a member or a sponsor of the Consultative Group. No national research programs are allowed to request funding.

Thirteen eminent scientists and economists, representing developing and developed countries equally, make up CGIAR's Technical Advisory Committee. This group advises on matters of research priorities, scientific research proposals seeking CGIAR assistence, and the effectiveness and operation of existing research programs. It meets two or three times yearly and visits international, regional and national centers to observe their work and research needs. The Advisory Committee's Secretariat is provided by the FAO.

Agribusiness firms in developed countries conduct a major portion of the world's agricultural research. The types of businesses vary, among them:

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[11] Ibid., p. 11.

FIRMS DOING RESEARCH

- grain producers
- meat producers
- dairy product companies
- agricultural research firms
- fruit growers
- producers of specific products such as sugar or cotton
- companies dealing with planting, protection against pests and diseases, harvesting, and slaughtering.

These firms range from small companies dealing in one aspect of agriculture to large, multi-national conglomerates that deal in many aspects of food production.

The research undertaken also varies. The Green Revolution was, to a great extent, the result of the ingenuity and investment of private companies in the production of seeds, fertilizers, pesticides, and other aids to modern agriculture.[12] Too, many of the foods now taken for granted -- margarine, for example -- are the result of such research of the past.

TYPES OF AGRICULTURAL RESEARCH

Today's work includes farming methods, plant and animal genetics, techniques of animal husbandry, the development of new foods, and increasing the nutritional value of foods. Examples of these research programs are:

- nutritional improvement of grains by fortifying them with vitamins
- production of food from oil seeds
- creation of protein foods from leaves
- use of animal wastes to produce livestock feed
- production of imitation meat products from vegetable protein sources
- discovery of methods to make better use of carbon dioxide in photosyntesis
- producing a "plant anti-freeze" to permit earlier planting
- development of techniques to induce cows to give multiple births
- the cloning of cattle
- development of heartier hybrids that prove more tolerant to weather and pests
- techniques to produce more eggs per chicken.

ADVANTAGES OF AGRI-BUSINESS IN RESEARCH

The agribusiness sector is particularly well-suited to undertake agricultural research because of the factors, essential to such work, that it can marshall:[13]

- research and development support
- marketing skills
- management ability
- investment capability

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[12] Alan Berg, The Nutrition Factor, op. cit., p. 145.

[13] Ibid.

Research takes place in laboratories and in testing fields at experimental centers developed, owned and managed by agribusiness firms. Multi-national firms have research centers in various parts of the world including developing areas. Work now, as in the past, is undertaken independently as well as in association with host governments, overseas governments, university centers, and international organizations.

EXAMPLE OF RESEARCH

The recent breakthrough (summer 1975) in hybrid wheat by the U. S. firms of Pioneer Hi-Bred and DeKalb AgResearch offers a good example of the type of work undertaken by the agri-business sector and its importance to the field of agriculture and agricultural development. These two firms, working in their test fields in experimental centers in Yoder, Kansas, have developed hybrids that have the potential of increasing by twenty per cent the production of hard red winter wheat, the world's main source of bread. Nearly two-thirds of U.S. wheat acreage is planted in hard red winter wheat. The seed is sown in early autumn and harvested in June and July. The new hybrids are plants that produce more grain heads per plant than the best yielding pure bred varieties and are stronger-stemmed, making them more resistant to early summer damage often caused by wind and rain. These plants could also be grown under the same conditions in Southern Europe, the Middle East, lower South America, and Australia.[14]

To a great degree, the work of the agribusiness firms has been focused on agriculture in developed countries or products imported by developed countries. Techniques, however, can often be applied to situations within developing countries or serve as bases for new work in these areas.

RESEARCH AND DEVELOPMENT

Modern science and technology can release agriculture from the constraints of soil and climate. But to have effect on the development process agricultural technology must be coordinated with the entire infrastructure of a society: cultural, social, economic, political. Otherwise it will become a superficial attempt that cannot penetrate to achieve permanent result.

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[14]Seth S. King, "New Wheat Offers 20% Output Gain", New York Times, July 3, 1975, p. 39.

WORLD FOOD SHORTAGE:

AID PROGRAMS

Aid programs to decrease hunger and malnutrition and increase food supply can be divided into two groups -- food aid programs and development assistance programs. Food aid programs are those which distribute food, or financial assistance to acquire food, donated by governments for the benefit of the recipient countries. Development assistance programs provide financial aid and economic and social development programs that result in increased financial or technical ability of that society to obtain food. Donors come in the form of international organizations, regional or interest groups, national governments, and private, non-governmental organizations.

FOOD AID PROGRAMS

Food aid programs have been initiated to cover three sets of circumstances:

- in emergencies resulting from man-made and natural disasters. Such aid has been included in U.S. Public Law 480 grants (the designation for foreign aid grants under the Agency for International Development), EEC Commitments, and the United Nations World Food Program conducted by the Food and Agriculture Organization — IN EMERGENCIES
- facilitating economic and social development programs and projects.[1] Such aid has been included under the World Food Program, World Health Organization programs, UNICEF and United Nations Relief and Works Agency programs. — IN DEVELOPMENT
- relieve pressure on budgets and balance of payments. These instances include funds in U.S. programs used to finance social and economic development projects. — FINANCIAL

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[1] The technical difference between programs and projects is that programs distribute food out-right, projects distribute food as part of development assistance programs. Unless otherwise designated, the term program will subsume both types of programs in this paper.

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DONORS

Food aid programs, originally begun by the U.S. but now offered by most developed countries, are extended by grants and loans. The major sources of such aid are bilateral programs initiated between national governments.[2] Since 1973 the nominal and real value of this aid declined.[3] Twenty-three per cent is multi-lateral aid. The major source from this area is the World Food Program conducted by the Food and Agriculture Organization for the United Nations. Other sources are programs of the European Economic Community (EEC), World Health Organization (WHO), United Nations Development Program (UNDP), and United Nations Relief and Works Agency (UNRWA).

CRITICISM

Critics of food aid have cited several reasons for their disenchantment with this form of assistance. They claim that the resultant increased supply of food decreases prices of the national product with accompanying decrease in the incentive to grow food. In the same vein, since the problem of hunger has been diminished by food aid, the government is under less pressure to change the system and necessary reforms are stymied so that permanent, rather than temporary, relief is not resultant.

DOMESTIC PROBLEMS

Effects of such programs will also be felt in the international trade sector, for markets will have been filled by aid grants and loans rather than imports in exchange for exports. Further, food aid may cause a shift in public tastes from local food to imported products, increasing demand for the import in the long run and, thereby, putting additional strain on balance of payments.[4] Attempts at solving these problems have been undertaken by instituting the following:[5]

- FAO Principles of Surplus
  - standards set up to control the disposal of surplus.
- Food Aid Conventions
  - to protect directly the commercial wheat export market
- Wheat Trade Convention
  - guidelines to distinguish between non-commercial and commercial transactions

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[2]Organisation for Economic Cooperation and Development (OECD), Development Cooperation, OECD, Paris, November 1974, p. 88.

[3]Ibid, p. 87.

[4]Organisation of Economic Cooperation and Development (OECD), Food Aid, Paris: OECD, 1974, p. 14.

[5]OECD, Development Cooperation, op. cit., p. 92.

Finally, management problems may also arise. These include: MANAGEMENT PROBLEMS
- the need to set up a balanced composition of food aid[6]
- balancing the advantages of programs against those of projects
- the need for planning and evaluation
- setting up local administration
- the ever-persistant difficulty of transportation.

Food aid has, however, proved superior to other forms of aid in times of emergencies, natural disasters and in favor of vulnerable groups such as women and children. It has also been successful when financial aid was not forthcoming. FOOD AID ADVANTAGES

To maximize the benefits of its impact, the administration of food aid will require certain changes both for individual programs and within the entire scope fo food assistance:[6]
- the establishment of a minimum short-range target for available volumes of food aid, with longer-term reassesments made periodically
- the establishment of food reserve stocks to protect aid from market fluctuations
- planning for long-range food aid policies, nationally and globally
- expansion of activities of the multilateral community to decrease political and commercail considerations and increase participation by smaller donors.
- establishment of an Information and Early Warning System
- increased co-ordination of administration between donors and recipients, assistance agencies and donors, and donors and donors
- establishment of methods for and increase use of evaluations to assess effectiveness of programs in order to judge present conditions and plan for future work
- expression of food aid in terms of stock volume, rather than money to account for price fluctuations.

The second main category of aid programs affecting the world food shortage are development assistance programs. It includes many types of programs: DEVELOPMENT ASSISTANCE PROGRAMS
- technical training and assistance
- disaster relief
- research

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[6]OECD, Development Cooperation, op. cit., p. 99.

- participant training
- extension services
- advisory
- financial aid in the form of loans for eased credit criteria
- trade agreements

These programs are either set up to influence food supply directly or indirectly as part of larger economic or social development programs.

Aid programs have as diverse sources as they do activities. Programs to affect food supply, hunger and malnutrition are conducted at the international, regional, and national level. They are also the domain of private non-governmental agencies in just about every developed and many developing country. Programs are conducted bilaterally and multilaterally.

INTERNATIONAL SOURCES

Included in the international setting are organizations such as:

- World Health Organization (WHO)
- International Bank for Reconstruction and Development (IBRD)
- United Nations Educational Scientific and Cultural Organization (UNESCO)
- United Nations International Children's Fund (UNICEF)
- United Nations Development Program (UNDP)

These represent the group of international organizations that are concerned with the food problem as it relates to their primary interest -- whether of health, finances and trade or development as a whole. The United Nations Food and Agriculture Organization is the international organization whose main interest is specifically world food supply.

WHAT FAO DOES

The United Nations Food and Agriculture Organization plays a dual role in its attempt to relieve world hunger. As a world source for the most up-to-date knowledge on agricultural development problems, the FAO expends part of its energies in collecting and disseminating information. The organization's second involvement in the area of world food shortage is as field projects conductor for programs instituted at the request of UN member governments. As such, its priorities lie in programs to:[7]

- extend high-yield cereal varieties
- try to close the "protein gap"
- conduct a "war on waste"
- better mobilize human resources
- promote foreign exchange earning and saving.

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[7]Food and Agriculture Organization (FAO), Second World Food Congress: Study Guide, Rome: Food and Agriculture Organization, 1969, p. 3.

WORLD FOOD PROGRAM

In 1963, the FAO in conjunction with the United Nations, set up a three year experimental World Food Program. At the end of this period, the organizations voted to keep the program "for as long as multilateral food aid is found feasible and desirable".[8] Its purpose is to promote economic and social development -- including community development, building industries and public works, feeding school children, mobilizing unemployed manpower, and feeding farm animals -- and to aid victims of emergencies. The headquarters for the World Food Program is in Rome, Italy where the administration is shared by a joint UN-FAO unit made up by a staff of about 180 with an additional 130 field officers in project countries. The head of this unit is the Director General who serves a five year term of office. All UN member countries who contribute to the program or those who can benefit from it are included in the World Food Program's realm of action.

From 1963 to 1972, the FAO's World Food Program has conducted 550 projects in eighty-eight countries at a total cost of over 1,200 million dollars. Actually, however, this amount reflects only aprt of the project's total cost, since three to four times the value of the program's inputs have been covered by the countries which received this aid.[9] Often the FAO aid acts as a stimulus for beginning a project subsequently handled by the receiving country.

The types of emergencies covered by the World Food Program fall into two categories: natural disasters, and refugee services. For the 161 emergency operations in seventy countries from 1968 to 1972, the bill has been more than 120 million dollars[10], or about one tenth the total cost of the programs's projects.

In 1973, Dr. A. H. Boerma, Director-General of the FAO, proposed a Minimum World Security Plan, to provide "a framework for national action and international consultations in order to evolve - by governments themselves - a new food security system for the world".[11] Its aim was to ensure a

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[8]Food and Agriculture Organization (FAO), World Food Program: What It Is, What It Does, How It Works, Rome: FAO, 1969, p. 5.

[9]Ibid, p. 5.

[10]Ibid, p. 8.

[11]Society for International Development, Survey of International Development, Volume X, Nos. 9 and 10, November/December 1973, p. 3.

safe level of food reserves in all countries through the establishment of minimum securityreserves in all countries by the establishment of minimum security stocks. Each country would have a national stockholding, making the responsibility for assured adequate and always available supplies a shared one. Regular meetings would be held to review the food situation, judge the adequacy of existing stocks, and recommend needed action. In developed countries, the built-up stocks would assure domestic requirements, regular commercial exports, and food aid to meet crop failures or natural disasters in other areas of the globe. In developing countries, the reserves would produce increased self-reliance and the ability to withstand fluctuating crops. International agencies would undertake the responsibility of helping these devleoping countries establish and maintain these stocks.

The major criticism of the Minimum World Food Security Plan is that it, too, fails to go to the root of the world food problem, for it does not provide plans to secure a better balance in world agricultural production and trade between the developed and developing countries. To cover this contingency, the FAO has also proposed the International Agricultural Adjustment Policy. Instituted at national, intergovernmental, and international levels, this plan seeks to ensure "orderly, stable growth of world agricultural production and trade to the mutual benefit of all countries and the expansion of export opportunities for products of the developing countries."[12]

FAO plans, just like those of any other international organization, can only be as effective as its members allow them to be. This depends on how vital the issue involved is to the countries involved. Until the events of 1973 impressed upon them the dire importance of cooperation, the authority of the FAO often took a backseat to political motives. Hopefully, nations will discover and will continue to be impressed by the importance of working together in and with international organizations, to manage international systems and to relieve and help solve the immense and ever-growing problem of world food supply.

REGIONAL AND INTEREST GROUPS

Regional and interest organizations concerned with the world food situation include:

- African Development Bank
- Inter-American Development Bank
- Asian Development Bank
- European Development Fund

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[12] Ibid.

- Organisation for Economic Cooperation and Development
- Organisation of Petrol Exporting Countries

Every developed country spends a portion of its yearly budget on foreign aid. In the United States, this sector is administered by the Agency for International Development. The 1975 U.S. Federal Budget of 323.6 billion dollars included a designation of 875.2 million to this agency.[13] U.S. foreign aid, like that of other countries, takes the form of grants and long-term loans for the transfer of food, manufactured products, expert services, technology and other resources.

DEVELOPING COUNTRIES

Development assistance also takes place between the developing countries. The majority (two-thirds) of such aid comes from oil-producing countries to Arab states, and, for a large part, takes the form of technical assistance.[14] It also includes capital assistance and export credits. Aid between developing countries also occurs from their contributions to the multilateral ortanizations to which they belong.

PRIVATE VOLUNTARY AGENCIES

The final sector from which aid programs come is that of private voluntary agencies. These number in the thousand, coming from many developing countries, as well as from every developed one.[15] Their work is as varied as the governmental, regional, interest, and international groups. They extend aid to communities and countries alike. Such organizations range from public-spirited, suburbanite groups to highly specialized, government-financed, professional associations. Included are national and local, as well as religious and secular, voluntary agencies, missions, foundations,universities, farm unions, research institutes and one-man concerns, which derive staying power from a host of motivations -- missionary zeal, scientific curiousity, enlightened self-interest, outrage coupled with conviction.[16] Like that of the other sectors, their work includes technical assistance, research, food aid, extension services, and disaster relief. They also serve as effective instruments of public opinion and as lobbying groups to influence decision-making bodies.

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[13]These are estimated government figures as of May 30, 1975.

[14]Organisation for Economic Cooperation and Development (OECD) 1969 Review, Development Assistance, Paris:OECD, 1969, p. 60.

[15]Examples of these organizations can be found in the memberships of the UNESCO sponsored Coordinating Committee for International Voluntary Service, the American Council of Voluntary Agencies, and the International Council of Voluntary Agencies.

[16]Virginia Carollo, Technical Assistance to the Developing World, New York: prepared for the Management Institute for National Development, 1967, p. 4.

THE UNITED NATIONS WORLD FOOD CONFERENCE:

A PROMISE FOR THE FUTURE?

The United Nations World Food Conference convened in Rome November 5th, 1974 and met through November 16th. The conference participants included delegates from approximately 135 countries, their alternates and advisers. Delegations were generally headed by a Foreign Minstry Chief or Secretary of Agriculture. The official delegates on the plenary floor were limited to six per country, but alternates and advisers were allowed to fill empty seats in delegations during committee and plenary meetings. Representatives from pertinent UN organizations[1], intergovernmental organizations[2], and popular liberation front organizations were also allowed a seat on the floor and a voice in the meetings. Finally, approximately 400 observers (both official and unofficial) from non-governmental organizations (NGO's) were allowed to sit in on plenary and committee sessions and to speak to the meetings with the approval of the delegations.

BACKGROUND

The first call for a forum to focus on world food shortage came in September 1973 when the Conference of Non-Aligned Countries in Algiers urged that:

> "...in the context of the serious food crisis confronting vast areas and populations of the world, an emergency joint conference of FAO and UNCTAD [United Nations Conference on Trade and Development] should be convened at ministerial level in order to formulate a programme of international cooperation to overcome the increasing shortage of food and other commodities, and to maintain stable prices."

The same year, U. S. Secretary of State Henry Kissinger echoed this sentiment in his first speech before the UN General Assembly, proposing that:

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[1]These included the International Labor Organization (ILO), the World Meterological Organization (WMO), the World Health Organization (WHO), the Food and Agriculture Organization (FAO) and the World Bank.

[2]Development Banks, the European Economic Community, and the Organization for Economic Cooperation and Development, for example.

"... a world food conference be organized under United Nations auspices in 1974 to discuss ways to maintain adequate food supplies and to harness the efforts of all nations to meet the hunger and malnutrition resulting from natural disasters."

CONFERENCE POWERS

The conference had the power to make resolutions, recommendations and proposals to be sent to the General Assembly after approval by the individual nations.

PLENARY MEETINGS

Each delegation was given time before the plenary body to express the official stance of its government. The average speech was about thirty minutes, but many spoke for an hour. The tone was highly political and most times could be categorized as either defensive -- the case of most developed countries -- or accusatory. Developing countries generally took one of two stances:

OFFICIAL STANCES

- angry denounciation of the developed countries for their past colonizing practices and past and present aid and trade policies. They often held that since the developed nations were responsbile for the plight of the developing countries, they should be responsible for the solutions to the resulting problems.

- emphasis on the degree and urgency of their need with the expression of hope that the developing and developed countries could and would work together for the fatest and most effective solutions.

The highly political atmosphere should have been both understandable and expected. An intergovernmental conference, by its very nature, is a political meeting. Alignments and 'bargaining blocs' were divided into three groups:

- Group A : The Communist-block countries
- Group B : The developed countries
- Group C : (also called the Group of 77) The developing nations.

The most crucial discussions and decisions were made behind tightly closed doors in small groups. Outsiders (the press and NGO's) were strictly forbidden.

COMMITTEE MEETINGS

The work of the conference took place in three committees. Committee I discussions revolved around:

- ways to increase food production in developing countries within the broader framework of development
- policies and programs to improve world-wide consumption patterns, aiming at insuring adequate availability of food in developing countries, particularly in vulnerable groups such as children.

Committee I resolutions dealt with:[3]

- fertilizer use and availability
- agricultural research
- education programs for small farmers
- food aid
- development of sea-farming
- agrarian reform
- trade adjustments for increasing growth incentives
- eradication of disease
- use of pesticides
- agricultural training
- food production.

Committee II discussed national and international action programs for strengthening world food security; improvement of the food information system, including adoption of an early warning system for crop failures; improved arrangements for emergency relief and food aid. Committee II resolutions included:

- urging governments to cooperate in setting up a World Information and Early Warning System, calling on the International Wheat Council to draw up the necessary arrangements
- proposal for establishing a system of international and national grain reserves.

Committee III was assigned the topic of International Trade directly related to food problems. This included measures to stabilize and expand developing countries' export markets. As a result, Committee III called on governments to:[4]

- solve the problem of unstable agricultural markets
- strengthen the work of the United Nations Conference on Trade and Development (UNCTAD), General Agreement on Tariffs and Trade (GATT), and the FAO
- strengthen the work of the International Wheat Council
- set up reasonable food import prices for products from developing countries
- remove unreasonable tariff restrictions
- assure reasonable prices for agricultural production inputs
- prevent speculation aimed at earning unreasonable profits by destabilizing markets.

Among the Conference resolutions sent to the General Assembly for approval were recommendations for four international bodies

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[3]C. Dean Freudenberger, "Report From Rome", Bread for the World Newsletter, December, 1974, p. 2.

[4]Ibid., p. 3.

to be established to promote increased international cooperation:

CONFERENCE RESOLUTIONS

- World Food Council -- to strengthen and coordinate all international institutions dealing with food production, food security, nutrition, and food aid
- International Fund for Agricultural Development -- to increase investment in developing countries for improvement of agriculture
- International Security Reserve System -- to be held nationally and monitored internationally to provide information, price stability and emergency aid
- Consultative Group on Food Production and Investment in Developing Countries -- to be set up by FAO, UNDP and the World Bank to increase, coordinate and improve the efficiency of financial and technical assistance to agricultural production in the developing world.

The most immediate outcome of the conference was the official recognition of the crisis by the nations of the world and a commitment to resolving it. The recommendations of the conference and the proposed international organizations were approved by the General Assembly in December 1974. Since that time, specific UN agencies have undertaken the vast task of implementing these resolutions. Such action has included:[5]

CONFERENCE RESULTS

- formulation of physical and biological criteria and the establishment of partial inventories for agricultural production in several areas of the world by the FAO
- under FAO's International Fertilizer Supply Scheme, forty assistance operations involving thrity developing countries and amounting to 66.5 million dollars has been carried out so far
- The World Meteorological Organization (WMO) has initiated development of programs on climatic variability and weather modification on agricultural production in various climatic zones, including studies on the Sahel, Sudan and South-East Asia
- a world-wide Current Agricultural Research Information System (CARIS) will be implemented during 1975 and 1976, with the aim of a systematic collection and dissemination of data on research

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[5]World Food Council, Progress Report on the Implementation of Resolutions Adopted by the General Assembly and the World Food Conference, WFC/3, Add. 1, May 2, 1975.

institutions, research workers, and research programs in developing countries or in developed countries for developing countries
- A number of new initiatives are planned for CGIAR for 1975, including establishing a new international agricultural center to serve the dry zones, such as the Near East and North Africa
- UNESCO has approved a program and budget for activities which include pilot projects on the role of education in integrated rural development, cooperative studies of agricultural education systems,and in-service training courses for agricultural teachers
- FAO Seed Industry Development Programme plans to prepare Seed Industry Reports for a further twenty-three of the least developed countries during 1975-1977, thus bringing the total to twenty-eight
- FAO called an Inter-Agency meeting which prepared draft Nutrition Planning Scheme whereby interdisciplinary task forces will help governments in including nutritional goals and policies into their development plans, and also train national staff in nutrition planning
- As recommended, the World Food Programme has intensified its food aid to Guinea Bissau, Cape Verde, Mozambique and Angola
- the FAO Council in November 1974 agreed to establish in FAO a Global Information and Early Warning System as recommended by the World Food Conference
- FAO is strengthening its technical assistance to help developing countries to improve their food information systems. WMO also has a program to assist countries in developing their national meteorological observations and data collections and processing capabilities.

WORLD FOOD COUNCIL

The World Food Council met in Rome in June 1975. Although there was a contentious feeling between the developing and developed countries, four substantive areas had positive reports to make:

- Food Aid Target: Set by the World Food Conference at ten million tons, all but about one million has been accounted for. The U.S. announced that it plans to expand its 1974-75 contribution of 5.4 million tons to 6 million tons
- Security Reserve System: Most countries agreed that such a system, set at ten million tons a year, is necessary. The U.S. was alone in its argument against long-term planning for fear of

negative effects on market prices
- Agricultural Development Fund: The goal is to establish a fund of five billion Special Drawing Rights[6], of which one billion is to be contributed by 1976, by 1980. The OPEC countries have indicated that they will match whatever sum is donated by OECD members
- Fertilizer Supply: The 'gap' between supply and demand for fertilizer has been set a one million tons. That gap is slowly being filled. The larget contributor has been the United Kingdom with 100,000 tons committed.

SUCCESS OR NOT?

It remains to be seen how successful the new international bodies will be. Much depends on the recognition and acceptance by governments that the 'crisis' is not a one-shot problem to be 'solved' through short-term actions; but a condition of a world strongly affected by underdevelopment and inequity of resource distribution. In addition, the efficient administration of any international organization is difficult to achieve. Finally, success is dependent on the willingness of governments to compromise, setting aside grievances between the developing and developed and concentrating on efforts to remedy the problem.

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[6] Special Drawing Rights (SDR's) represent a pooling of national currencies placed on deposit with the International Monetary Fund. Pooling tends to modify exchange fluctuations of any one national currency. Currently one SDR equals 1.22 dollars.

SUMMARY

The main problem of world food supply is providing the world's population with at least a minimally sound diet. This means at least a doubling of food production. "Whatever else happens and whatever urgent measures are taken, food is going to be the overriding issue of the next thirty years."[1] The crisis of 1972-73 revealed the fragile nature of the world's agricultural equilibrium and the reality that the problem of food supply does not exist in isolation from other world problems, such as population, poverty, and illiteracy. It also demonstrated that agricultural production is but one facet of feeding the world. Also included are:

- problem analysis -- what is wrong?, what should be done?, what will be the result?
- non-conventional agricultural and non-agricultural methods of food production
- transportation and distribution systems
- governmental trade and aid policies
- natural phenomena
- human development

This realization prompted the recognition that technology, rather than providing the final answer to the problem, is simply one tool whose effectiveness depends on decisions and policies made by members of the global community.

Eliminating hunger and malnutrition in the future will require a global effort involving far more than increased agricultural production. It is essential to avoid the past problem of treating the world food situation simplistically as a one-dimensional issue existing in isolation. Solutions will need to include all levels of society and government and consideration of all factors of nature and man. Plans will have to be well thought out and made long and short-term, contemplating both immediate and future problems.

Basic to future 'hunger policies' is the necessity for reordering priorities -- global, national, and personal -- turning national energy away from achieving greater affluence and toward eliminating obstacles to development.

The choice of international policies and programs should be made in consideration of the acceptability of their strategy,

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[1] Georg Borgstrom, The Dual Challenge to Health and Hunger, op. cit., p. 2.

desirability, necessity, and staff. All phases should be cooperative (between developed and developing countries) in nature and practice. Scientific research work must have an international basis for exchange of material, information, and personnel. At the same time, individual research centers are most successful as decentralized systems at least partially dependent on local funding and responsive to local commodity and development interests.[2]

Future work in the area of man's dependence on nature could include work on increasing water supply for agricultural use, devising river diversion techniques such as those already underway in the USSR, desalination techniques, and techniques for the manipulation of rain fall patterns. In the area of food production, improvements on the advances of the Green Revolution could maximize its potential. It could be carried out within a social framework of land reform and participation by the people as a whole, providing maximum jobs and the greatest possible distribution of the gains from the new productivity; it could include extension services, providing agricultural research, farmer training centers, adult literacy programs, and strong management; it could end great amounts of environmental waste by including evaluation of traditional techniques and environmental realities into its framework of expertise; and it could provide the necessary scientific research and personnel, transportation and market structures, and cooperative and extension services to reduce waste and increase equity of food distribution.[3] Further and careful study and promotion of nonconventional methods and foods are also called for.

As the food situation becomes more precarious and the world's interdependence more obvious, international cooperation will become more acceptable in political circles. This may include an acceptance of the authority of the international bodies set up as a result of the World Food Conference to the point of effective operation. Too, it could include international management of ocean fisheries or weather control.

Finally, the whole area of human development will have to become more than an emergency relief operation. Policies of population stability, income distribution, and literacy and employment training, will need to become the business of every national government. Minimum world standards of health, education, and welfare must carry authority. As the effect of the conditions of world food shortage are felt more and more in developed countries and in richer segments of developing countries, progress can be hoped for.

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[2]Ruttan, op. cit., p. 7.

[3]Ward and Dubos, op. cit., p. 169.

Because of the limitation of vital resources and of the ever-increasing interdependence of the world's societies, food shortage is an international problem. Essential to attacking this world problem is the understanding that "each country is, in some way, a personality in its own right, and this excludes any generalization on many aspects of the world food situation".[4] Therefore, although the approach must be international, each nation, whether developing or developed, must be responsible for its specific programs and their success. These considerations must include the make-up and nutritional value of national diets; equitable availability and pricing of food; production, distribution, marketing and trade systems; and the propensity and incentives for change.

Most important, it must be emphasized that hunger, although viewed as a universal problem, is a very individual reality. Statisitcs boil down to personal experience, generalities to particulars. Humanity is made up of individual people, not abstract masses. Nations do not starve; men, women and children do. It is this that makes the issue of world food supply a problem -- a vital problem of universal importance.

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[4]Food and Agriculture Organization, Report of the Second World Food Conference, op. cit., p. 13.

INSTRUCTION GUIDE

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INTRODUCTION

This section provides suggestions for instruction techniques and resources to give greater depth to understanding world food supply. The guide is designed for use by teachers and students alike since both are learners in the instance of teaching about world food supply.

The guide is divided into four parts:

KEY TEACHING STRATEGIES
- those aspects essential for learning about and understanding the world food situation.

METHODOLOGY
- suggestions of techniques and skills supportive to learning about world food supply.

CLASSROOM DISCUSSION
- suggestions of materials and questions to stimulate classroom discussion and debate.

STUDY GUIDE AND RESOURCES
- those having direct relationship to the teaching outline of World Food Supply: A Global Development Case Study either as basic or as supplementary information. A comprehensive list of these materials and where they are available is included in this part.
- other useful material to stimulate thought and discussion.
- those organizations that can provide up-to-date information on recent activities and thought within the field of agriculture and agricultural development.

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KEY TEACHING STRATEGIES

GLOBAL DEVELOPMENT AND WORLD FOOD SUPPLY

The issue of world food supply does not exist as a separate entity in and of itself. Rather, it is one of the many situations which make up the much larger problem of global development. This point should be emphasized from the very beginning and stressed throughout. To do otherwise is to get caught in a tangle of interrelated factors without a frame of reference with which to sort them out.

Because an understanding of the problem requires knowledge and awareness of global development, ideally it is taken up within a specific course designed to help students grasp, intellectually and emotionally, their participation in an interdependent world. However, it may be undertaken within the structure of more traditional courses with suitable introductory emphasis that world food supply is part of global development.

A Global Development framework for the study of world food supply can be built by the use of the film TILT, followed by an encounter with the simulation game STARPOWER.

> TILT -- discusses the imbalance in distribution of the world's wealth and resources; shows some of the attitudes of rich and poor towards development; and poses some alternatives for development strategy. It has proven successful in stimulating a wide variety of audiences in the discussion of major issues (especially when shown more than once), without propagandizing specific solutions. It can be a useful tool in beginning discussion about development issues.
> Animated, 19 minutes, color, 1973, produced by the National Film Board of Canada.
> Order from BAVI, University of Wisconsin, 1327 University Avenue, Madison, Wisconsin 53706.
> Rental fee: $2.50.

> STARPOWER -- a game in which a low mobility three-tiered society is built through the distribution of wealth in the form of chips. Participants have a chance to progress from one level of society to another by acquiring wealth through trading with other particpants. Once the society is established, the group with the most wealth is given the right to make the rules for the game. The 'ruling class' participants almost inevitably decide to make fascistic,

unfair racist-type rules that generally result in some sort of rebellion by the other members of the society.
STARPOWER requires 18-35 participants and can be used by any age group with an adventurous and courageous teacher. Requires 1 to 2 hours to play.
Directions on how to make you own kit are available from SIMILE II, P. O. Box 1023, La Jolla, California 92037, for $3.00. A complete kit for 18-35 students is available from the same address for $25.

More intensive study can be implemented through the GLOBAL DEVELOPMENT STUDIES MODEL CURRICULUM FOR SECONDARY SCHOOLS AND UNDERGRADUATE COLLEGES, available through the Management Institute for National Development, and FOCUSING ON GLOBAL POVERTY AND DEVELOPMENT: A RESOURCE BOOK FOR EDUCATORS, available from the Overseas Development Council.

GLOBAL DEVELOPMENT STUDIES MODEL CURRICULUM -- the purpose of Global Development Studies is to help the students see themselves and their society as an inseparable part of the global community. The course recognizes the commonalities and the interdependence of societies and the intricate web of global systems, both man-made and natural, which are determining the several fates of these societies, sometimes beneficially, but as often harmfully. The Curriculum includes appendicies on Structural Methodology, A Suggested Framework for the Historiography of Global Development, an Annotated Bibliography of Periodicals, and an Index of Resource Organizations. It can be used as a year long course or implemented in traditional courses as a whole or in sections.
The Model Curriculum is available at $5.00 per copy from the Management Institute for National Development, 230 Park Avenue, New York, New York 10017.

FOCUSING ON GLOBAL POVERTY AND DEVELOPMENT -- a compilation of brief essays suggesting ways of integrating a development "perspective" into traditional courses in the social sciences, humanities, and the natural sciences; substantive background essays on particular development topics and specific teaching suggestions for dealing with topics of global development and world issues; and reading selections for students from a wide variety of sources including case studies, maps, and charts to be used as tools for implementing the teaching suggestions. An appendix includes a selective film guide, the results of a youth

opinion survey, a glossary, and a list of other organizations that could supply useful materials. Focusing on Global Poverty and Development is available at $12.00 per copy from the Overseas Development Council, 1717 Massachusetts Avenue, N.W., Washington, D. C. 20036.

Global Development Definitions

The following definitions are basic to an introduction of Global Studies:

A DEVELOPING COUNTRY: a country with a per capita income of less than $500 per year (UN Standard). Most of these countries are concentrated in Asia, Africa and Latin America. Three quarters of the world's population live in developing countries in more than 100 nations, more than seventy of which have received their independence since World War II.

THIRD WORLD COUNTRIES: developing countries with extensive natural resources which are essential to industrialized areas.[1]

FOURTH WORLD COUNTRIES: developing countries with few natural resources to depend on for industrialization. These are countries with per capita incomes of less than $200 per year; countries "deficient in everything except people".[2]

AVOID SIMPLISTIC APPROACHES

The complexity of the issue of world food supply may at first seem overpowering. Giving simplistic or superficial explanations or concentrating only on one facet of the issue, however, results in confusion and inability to grasp important concepts and realities. The problem, then, must be broached and the best time to do it is when introducing the all-encompassing idea of global development.

One very good way of getting across the interconnecting relationship of varied factors is to take the example of the bicycle wheel. Its various spokes start out from the hub

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[1]Donald Ross, Food and Population, New York: The Conference Board, 1974, p. 1.

[2]Ibid.

and reach diagonally to the rim, each having its own individual starting and finishing point. But the balance of the wheel and its durability depends on the many overlappings of the individual spokes as they go from hub to rim. The faster the wheel spins the more times the spokes seem to overlap until they become blurred into one continuous movement. So it is with the factors of world food supply and global development -- economic, political, sociological, ecological, developmental, etc. Each has its individual properties, but what gives the situation its unique construction is the many interrelationships that appear as one, once the issue starts moving.

Equally, it is important to properly place action-type exercises, such as those where students are asked to forgo a meal, fast for a day, eat only cereal products or one less hamburger per week. These may have symbolic value and offer an expression of concern, but the problems of world hunger will not be resolved through symbolic gestures. Such actions have the potential for developing awareness but should not be seen as an end in themselves.

WE VS THEY

One of the easiest traps to fall into is the 'we/they/ dichotomy. 'They' have a problem, 'we' must help. 'They' are poor, 'we' are rich. 'They' must change 'their' bad habits, 'we' must provide good examples.

The problem of world food supply is an issue of universal significance, cause, effect, and potential future impact. It calls for universal action. To tackle explanation in 'we/they' terms is to reject the reality of interdependence and a global community, two concepts vital to understanding world food supply.

ISSUE COMPREHENSION VS PROBLEM SOLVING

Conventional teaching involves tackling a topic by breaking it down into smaller and smaller units. The automobile engine, for example, is difficult to understand in and of itself, but identifying each of its components and how they function makes it clearer. The opposite, however, is the case when teaching about world food supply. In this instance, it is essential to take the holistic approach. View the subject as if it were a jigsaw puzzle. Identification of individual pieces -- a bird, a tree -- is important, but it is the overall picture that is the essential objective of study.

Traditional teaching methods also involve the teacher posing questions for which the student is to give an answer to be judged right or wrong. This assumes the existance of a 'known' -- the world is round (right), the sum of two and two is five (wrong), nitrogen is a gaseous substance (right), Tchaikovsky composed the 1812 Overture (right). The problem when dealing with world food supply is the shortage of 'knowns'. There are no answers. This is frustrating to both teachers and students who are used to questions with right or wrong answers. But it is real life and real life is an exciting challenge.

An important point of this study is that yes/no, right/wrong answers have little, if any, place. The world condition can be studied, analysed, commented upon. Programs and policies can be instituted to affect the situation. But the complexity and interdependence of the problem's all-encompassing factors make simplistic, superficial solutions irresponsible. It is more important to be able to recognize factors and understand their interdependence and complexity and their relation to the whole area of global development.

METHODOLOGY

Two of the best techniques to use when teaching about world food supply are:

- viewing the classroom as a 'research lab', encouraging students to join in the teaching process while the teacher joins in the learning process
- using the community as a resource center, driving home the idea of the universal character of world food supply.

The first involves:

- individual and group research projects concerning specific factors and geographic areas -- the role of oil products, the Sahelian drought -- with students conducting class discussion after presentation
- simulation games and other forms of 'role playing'
- guest speakers and interviews on specific aspects of food supply.

The second involves:

- recognition of community resources -- the local food producer, or agri-business executive, the returning Peace Corps member or retired AID official
- taking the class to the local supermarket to find out for themselves the extent of imported products on the shelves
- have each student or group price a common commodity weekly during the course -- sugar, bread, chicken. Why are the prices changing? This can be easily done by keeping an eye on the listing of prices of commodity futures in the daily newspaper which can be followed in much the same way one would the stock market. An alternate way would be to follow the supermarket advertisements from week to week.
- have the students explore and analyse presentations available in mass-media publications as the type of information that their community is receiving. Examples are:
  National Geographic
  Scientific American
  Discuss how the type of information one receives affects the view he has of an issue.

These two areas overlap a great deal. To make the best use of both techniques, students must acquire skills in:

- research: gathering information, outlining, identification of resource materials
- interviewing: how to prepare for each speaker, how to pose questions, how to analyse answers
- statistics: how to gather pertinent statistics, how to read charts and graphs.

Encourage interdisciplinary contact:

- invite the science department to discuss nutrition, soil erosion, irrigation, the combusion engine
- suggest to the English Department that research projects, debates, and presentations could provide a vehicle for teaching rhetoric and other communications skills
- coordinate the interests of the geography classes and the importance of nature's role in world food supply.

Other interdisciplinary cooperation depends on the individual school's situation and experience with interdepartmental planning.

CLASSROOM DISCUSSION

This section offers topics and questions for classroom discussion. Remembering the importance of the holistic approach, the class can:

- debate the differing viewpoints of governments at the UN World Food Conference held in Rome, November 1974
- consider various factors of hunger and malnutrition, use and distribution of resources, and policy-making and planning
- weigh the impact of history on the Malthusian Theory
- survey available information outside the classroom for the most recent official pronouncements.

AS OTHERS SAW IT: ROME 1974

There are many ways to 'view' the world food situation. The perspective of this paper, for example, is essentially one from a western developed country. The following represent viewpoints from many nationalities as expressed by their official representatives at the UN World Food Conference, and can provide stimulus for fruitful classroom discussion either by examining each carefully or by comparing them with each other or with the viewpoint of this paper.

MEXICO, President Luis Echeverria Alvarez:

"The consumer and waste society has upset the essential priorities of human development. The famine that today is paralyzing the activities of entire nations has been manufactured with the same detachment as that employed in the construction of the atomic bomb. The progressive transformation of cereals and grains into meat that makes over-consumption of meat in certain affluent areas of the world possible, destroys the possibility of a sufficient amount of protein in other parts of the world.

"A large part of one-crop agriculture in the Third World is established within the specific sphere of the needs of certain empires or multinational companies. The consequence of this has been ecological imbalance, erosion and the annual abandonment of hundreds of thousands of hectares in favor of continuing each year with a gigantic operation of geographic devastation.

"We propose a World Food Plan which will designate crop areas, make collective action possible, establish the bases for regulating the use of fertilizers, seeds and water, suggest new crops or new types of agricultural production and also provide true universal education as regards the value of food and the importance of protein in development."

ALGERIA, Layachi Yaker, Minister of Trade

"Algeria calls for increased food production in all developed countries. These countries have to replace the idea of production for commercial marketing to production for the

needs of mankind. And the commitment of developed countries should not be confined to food stuffs alone; it should include all agricultural inputs, such as fertilizer, pesticides and machinery."

JAMAICA, Keble Munn, Minister of Agriculture:

"Developing countries are handicapped in increasing their food production by the high cost of fertilizers and machinery, largely imported from the rich nations. Agricultural production for export in the developing countries, on the other hand, is for the most part unprofitable and unstable.

"The small farmer equates agriculture with poverty and seeks desperately to find ways of leaving the land. Farmers must be given concrete evidence that farming is a profitable enterprise."

CZECHOSLOVAKIA, Bohuslav Vecera, Minister of Agriculture and Food:

"World land resources are sufficient to feed all, even with a rising population. Developing countries have great reservoirs of natural resources and manpower. But one cannot expect full success in agricultural production without deep modifications in the social and economic structure."

BANGLADESH, Abdus Samad Azad, Minister for Agriculture, Local Government, Rural Development and Co-operatives:

"The people of Bangladesh, in common with the peoples of many other newly-independent countries, find themselves confronted with the equally monstrous problems of food and shelter, hunger and malnutrition.

"It is gratifying to note that the world has come to realize the enormity of the problem and that the developed and the developing countries have got together in a collective search for a solution to this problem now threatening the survival of millions of human beings.

"We have received valuable assistance. But the needs are so wide-ranging, urgent and critical that such assistance falls short."

VENEZUELA, President Carlos Andres Perez:

"World hunger is not the result of the recent petroleum crisis. During the last 50 years, when the price of petroleum was insignificant, the problem of hungry and undernourished people

has co-existed with the indifference of those countries who exploited their resources and labour.

"A drastic revision is needed in the present terms of international trade that favour the industrial countries and discriminate harshly against the countries producing raw materials."

SENEGAL, Adrien Senghor, Minister of Rural Development and Water Resources:

"There is still hope that a world seemingly dominated by egoism, with the 'haves' wasting grains for feeding their animals... will be able to unite in the face of threatened famine.

"Immediate measures should be taken for the establishment of food stocks, particularly grains and proteins, in order to prevent crises such as those recently witnessed and still rampant, particularly in the Sahel. These stocks must be placed at strategic points near famine areas. The international community should urgently finance the necessary installations."

PHILIPPINES, Carlos P. Romulo, Secretary of Foreign Affairs:

"It is no use, it is indeed shameful and degrading to wait for the developed countries to come to the rescue every time we come to the brink of starvation. Of course, when millions are faced with misery, offers of assistance must be welcomed as demonstrations of human solidarity. But we are not helpless - we must help ourselves."

U.S.S.R., Nicholas Rodionov, Vice-Minister of Foreign Affairs:

"Some explain food problems in terms of the population explosion but this is incorrect. Science in theory and in practice has proved that given certain social and economic conditions, there is great potential for food production. Talking about a population explosion appears to be an intentional attempt to veil real causes, which are in the social, economic and political fields.

"The solution to the problem of food supplies is first of all dependent upon peace in the world. Vast sums are spent on armaments and this undermines the confidence of countries in each other. We endorse the U.N. General Assembly resolution that permanent members of the U.N. Security Council reduce their arms spending by 10 per cent. The saving could be applied to agricultural development in the Third World countries."

POLAND, Kazimierz Barcikowski, Minister of Agriculture:

"The food problem was the result of wrong agricultural policies in vast parts of the world, motivated by profits and the placing of obstacles to trade and the rational exploitation of national resources. The first aim must be to implement measures leading to a just international divison of labour."

SWEDEN, Svante Lundkvist, Minister of Agriculture:

"We are able to land on the moon on a predetermined spot and time but we fail every day in reaching thousands of hungry mouths on the earth with the meal they need while there is still time."

PAKISTAN, Malik Khuda Bukshs, Special Assistant for Agriculture to the Prime Minister:

"The developing world will have to recognize that the solution of its food problems lies in its own hands and within its own countries. Agriculture will have to be accorded the highest priority.

"Social and economic and aid policies of the 1960s and 1970s have not permitted the developing world to provide farmers with the knowledge, means and incentives to increase production. How could the producers of food be expected to feed the hungry when they are themselves oppressed by a life of misery, poverty and deprivation? We all talk about farmers and endeavour to interpret their thinking and aspirations. Has not the time come to start listening to them at regional and international levels? Let the feeders of the world get together to chart a new strategy for the conquest of hunger."

TANZANIA, J. J. Mungai, Minister for Agriculture:

"The biggest plight facing the Third World is that our concerted effort to produce more is not a guarantee to increased earnings and capital for development investment. We in Tanzania have achieved tremendous volume increases in all our major export crops, but poor prices, compounded by higher prices of imports from developed countries have been a major constraint on our efforts to create a self-sustaining economy for our people."

CONSIDER FOR A MOMENT:

1. Hunger and Malnutrition

-what is the relationship between population, food production, rising affluence and hunger?
-is malnutrition synonymous with poverty? Explain your reasoning.
-is malnutrition incongruous with national economic development?
-what effect does malnutrition have in developing countries? In developed ones? What relationship does it have to stability in governments in both developing and developed countries?

2. Uses and Distribution of Resources

-how does the energy shortage relate to the food shortage?
-in your own community, what are inefficiencies that could be corrected to make better uses of available resources?
-is it necessary for each nation to develop its own programs to improve the food situation? Why? What role can intergovernmental and international organization play? How effective can these organizations be? What decides their effectiveness?
-does the inequity of resource distribution exist only between developed and developing countries?
-what are the advantages and disadvantages to the Green Revolution? What possible implications do you see it having for a society and its government?
-why have some societies chosen to focus on improving industry rather than agriculture? Consider both developing and developed countries.
-what is the relationship between population, literacy, unemployment and hunger?

3. Policy-making and Planning

-what is the importance of planning? In government policy-making? In aid project organizing? In agricultural production?
-why is a world-wide agricultural information system important? Why is it important that the USSR and China be represented in such a system?
-what is the difference between long-term and short-term policies in the world food situation? Can you give examples?

-it has been said that if every American gives up one hamburger a week, it would have a great effect on those now starving. Do you think this is true? Discuss.
-in the long run, what could the effect of decreased western consumption be? In the short run? What factors must be considered?

MALTHUS: FACT OR FANCY?

In 1798 Thomas Malthus, a British economist, published his now famous treatise "The Principle of Population", defining the population problem principally in terms of food supplies and the threat of famine (see OTHER USEFUL MATERIALS section). Since then the relationship between food and population has been perceived largely in terms of the Malthusian Theory.

Malthus's gloomy prophecy is a 'natural' for classroom discussion and debate and a rich source for discussions:

- has the Malthusian prophecy come true?
- is the relationship between food and population that Malthus describes in his treatise a rigid one?
- what factors must be considered in weighing the validity of the Malthusian Theory?
- what factors have intervened since 1798 that would have had effect on the validity of the Malthusian Theory?

INFORMATION OUTSIDE THE CLASSROOM

Encouraging students to research the food situation in various countries should include an enquiry into official government' policy to corresponding embassies or consulates in Washington, D. C. and New York. Many have public relations offices or information desks.

Students should be encouraged to contact various institutions with information because many are willing to disseminate their data. Teachers should, however, assist students in coping with or overcoming their inhibitions in dealing with institutions so that they become used to getting information from such sources.

SUGGESTION: Make sure student correspondence comes up to business letter standards. A hasty note on ruled school paper can fail to produce results.

Discussion and analyses of answers should provide fruitful class participation.

STUDY GUIDE AND RESOURCES

This section is designed to provide materials and resources corresponding with each section of World Food Supply as it is presented in this case study. Listed below are five key texts which are referred to extensively by chapter in the study guide, and FAO annual publication, and an introductory filmstrip, which are considered particularly outstanding. Where appropriate, supplementary readings and materials also are cited for each topic area.

These citations are fully described following the study guide. Also included is a listing of useful resource organizations.

Alan Berg, The Nutrition Factor: Its Role in National Development
This book offers the most valuable reading about nutrition's effect on the individual and development.

Georg Borgstrom, Harvesting the Earth
Prepared as a text, this book offers very good basic information, excellent charts and a good list of 'suggested materials' for further reading.

Lester R. Brown, World Without Borders
World Without Borders provides a good general introduction to development and development factors.

Lester R. Brown and Erik P. Eckholm, By Bread Alone
An excellent discussion of the world food situation as a factor within global development.

John McHale, World Facts and Trends: Where is Man Headed - A Multi-Dimensional View
This publication is invaluable for its statistical information.

Food and Agriculture Organization, The State of Food and Agriculture
Each year the FAO publishes The State of Food and Agriculture of that year, providing the most up-to-date information available.

Scott Education Division, Food: Will There Be Enough?
An extremely worthwhile filmstrip for a general introduction.

STUDY GUIDE

QUESTION I: WHAT IS HUNGER

HUNGER: WHAT DOES IT MEAN?

Basic Material:

Alan Berg, The Nutrition Factor

Chapter 1
Chapter 2

Georg Borgstrom, Harvesting the Earth
Chapter 10
Chapter 12
Chapter 13

Additional Material:

Sarah Reidman, Food for People (Revised Edition)
A very good and very basic introduction to nutrition. Excellent for getting across the importance of nutrition, what good nutrition means, what control man has over nutrition, the history of nutrition, and the impact nutrition will have for the future.

Arthur Hopcraft, Born to Hunger
Any choice of chapters; each deals with hunger in various developing countries.

Hunger in America (CBS Film)

To Feed the Hungry (Contemporary Films)

A BRIEF HISTORY OF FOOD AND POPULATION

Basic Material:

Lester R. Brown and Erik P. Eckholm, By Bread Alone
Chapter 2

WORLD AGRICULTURAL FOOD SUPPLY: TODAY'S WORLD

Basic Material:

Lester R. Brown, World Without Borders
Chapter 3

Lester R. Brown and Erik P. Eckholm, By Bread Alone
Chapter 3

Additional Material:

Nick Kotz, Let Them Eat Promises

Senate Select Committee on Nutrition and Human Needs, 1974 Report

C.A. Gibbons, D. C. Catt, R.C. Hankin, J.D. MacArthur, and P.B. Gravel, The Problem of Collecting Data on Food Production and Farming in African Economies
Contribution 1: Basic Statistical Problems in Evaluating the National Food Supply in African Economies
Contribution 2: Practical Problems of measuring Food Production and Conducting Nutrition Studies

Barbara Ward and Rene Dubos, Only One Earth
Part 4 (except the section on the Green Revolution)

QUESTION II: WHY IS THERE HUNGER? WORLD FOOD SHORTAGE AND HUMAN DEVELOPMENT

GENERAL INTRODUCTORY MATERIAL

Basic Material:

George Borgstrom, Harvesting the Earth
Chapter II

Alan Berg, The Nutrition Factor
Chapter 2
Chapter 3
Chapter 4

Lester R. Brown, World Without Borders
Chapter 4
Chapter 7
Chapter 8

Scott Education Division, Food: Will There Be Enough?
Filmstrip with teacher's guide included.

FAO, The State of Food and Agriculture

Additional Material:

Time-Life Films, Rich Man, Poor Man: Food

WORLD FOOD SHORTAGE: NATURE'S ROLE

Basic Material:

Lester R. Brown and Erik P. Eckholm, By Bread Alone
Chapter 6

Georg Borgstrom, Harvesting the Earth
Chapter 1
Chapter 2
Chapter 3
Chapter 4
Chapter 14

WORLD FOOD SHORTAGE: THE ROLE OF AGRICULTURAL PRODUCTION

Basic Material:

Alan Berg, The Nutrition Factor
Chapter 5 (except the section on the Green Revolution)
Chapter 8

Lester R. Brown and Erik P. Eckholm, By Bread Alone
Chapter 7
Chapter 8
Chapter 9
Chapter 11

Georg Borgstrom, Harvesting the Earth
Chapter 5
Chapter 6
Chapter 7
Chapter 8

WORLD FOOD SHORTAGE: THE ROLE OF GOVERNMENT POLICY

Basic Material:

Alan Berg, The Nutrition Factor
Chapter 9

Lester R. Brown, World Without Borders
Chapter 12
Chapter 10

Georg Borgstrom, Harvesting the Earth
Chapter 9

QUESTION III: WORLD FOOD SHORTAGE: WHAT IS BEING DONE?

THE GREEN REVOLUTION AND AGRICULTURAL RESEARCH PROGRAMS

Basic Material:

Alan Berg, The Nutrition Factor
Chapter 5

Lester R. Brown and Erik P. Eckholm, By Bread Alone
Chapter 10
Chapter 12

Additional Materials:

Consultative Group on International Agricultural Research, International Research in Agriculture
This booklet gives a deeper analysis of each of the eight centers involved and the work they do.

ADM Milling Company, The Growing Challenge: Protein Cereal Products for World Needs
A very good and brief booklet on protein, nutrition, and cereals with good pictures, charts and graphs

Annual Reports
Each year Agribusiness firms, like other large companies, put out annual reports. Part of these reports is a discussion of the research that they are undertaking.

These can be quite informative not only as reports on research, but also as a method of 'seeing agriculture at work'. Some suggestions of companies to write for reports are:

Northrup, King and Company
Minneapolis, Minnesota
DeKalb AgResearch, Inc.
DeKalb, Illinois
Pioneer Hi-Bred International, Inc.
Des Moines, Iowa
CPC International, Inc.
Englewood Cliffs, New Jersey
Kellogg Company
Battle Creek, Michigan

WORLD FOOD SHORTAGE: AID PROGRAMS

Basic Materials:

Lester R. Brown, World Without Borders
Chapter 15

Organisation for Economic Cooperation and Development, 1969 Review: Development Assistance
Used as a whole or selecting individual chapters, this study gives a good basic understanding of aid and how it is used. Good Tables in the appendices.

Organisation for Economic Cooperation and Development, 1974 Review: Development Cooperation
Chapter V

Organisation for Economic Cooperation and Development, Food Aid
This book gives a very good and comprehensive view of the types of food aid given by the members of OECD to developing countries. There are general analyses, country write-ups, and very good tables on amounts of aid, who receives it, and its use.

Food and Agriculture Organization, Strategy for Plenty - The Indicative World Plan for Agricultural Development
This is a short booklet summarizing the FAO's two volume, 72 page report. The Indicative World Plan brings together information to provide evidence to

"form a basis from which it will be possible to indicate what are likely to be major problems over a twenty year period" with target dates of 1975 and 1985. It is not intended to be a blueprint but makes such suggestions as:

- what may be the most urgent jobs at different points in these 20 years
- what may be the most urgent jobs in different areas
- proposing objectives within the bounds of possibility

In doing this, the report indicates needed policies, resources, and priorities.

Additional Material:

Alan Berg, The Nutrition Factor
Chapter 10
Chapter 11

Agency for International Development, War on Hunger
A monthly that gives a short explanation of AID, a brief discussion of the current food situation, and a short article on at least one AID program. This is an excellent little monthly and can be ordered simply by getting your name on AID's mailing list. (See Comprehensive List of Suggested Materials)

THE UNITED NATIONS WORLD FOOD CONFERENCE: A PROMISE FOR THE FUTURE?

Basic Material:

U.N. World Food Conference Report

United Nations World Food Council, Progress Report On the Implementation of Resolutions Adopted By the General Assembly and the World Food Conference

Additional Material:

PAN

PAN was the conference newspaper at the World Food Conference. It was published by the International Council of Voluntary Agencies, with financial support principally

from Oxfam, Christian Aid, Friends of the Earth. It was produced by independent journalists and provided the services of keeping everyone 'up' on what was happening, tying together these 'happenings' and those outside of the conference, and providing a non-partisan viewpoint of the proceedings and outside comment for which just about everyone there was grateful. All issues are available from ICVA (see Comprehensive List of Suggested Materials)

SUMMARY

Basic Material:

Alan Berg, The Nutrition Factor
Chapter 6
Chapter 12

Lester R. Brown, World Without Borders
Chapter 16
Chapter 17

Additional Material:

Barbara Ward and Rene Dubos, Only One Earth
Chapter 15

A COMPREHENSIVE LIST OF SUGGESTED MATERIALS

A. CITATIONS INCLUDED IN STUDY GUIDE

ADM Milling Company, The Growing Challenge.
Available from:
ADM Milling Company[1]
A Member of Protein/Cereal Products International
Box 7007
Shawnee Mission, Kansas 66207

AG WORLD. Available from:
The Webb Company
Attention: Mr. Edward Jackson
1999 Shepard Road
St. Paul, Minnesota 55116

Berg, Alan, The Nutrition Factor: Its Role in National Development.
Washington, D. C.: The Brookings Institution, 1973.
Available in paperback through:
The Brookings Institution
1775 Massachusetts Avenue, N.W.
Washington, D. C. 20036

Borgstrom, Georg, Harvesting the Earth.
New York: Abelard-Shuman, 1973.

Brown, Lester R., World Without Borders.
New York: Random House, 1972

Brown, Lester R. and Eckholm Erik P., By Bread Alone.
New York: Praeger Publishers, 1974.

CBS Report Film, Hunger in America.
Color, 52 minutes, 1968.
The purpose of the film is to make Americans aware of the hunger in the U. S. It involves four areas: Mexican-Americans in San Antonio, poor whites in Virginia, Navajo in Arizona, and rural blacks in Alabama. This was the film which prompted a government investigation of the problem of hunger in the U. S.
Available from:
AFL-CIO Film Division, Washington, D. C.
University of Indiana, Bloomington, Indiana
Mass Media Ministries, Baltimore, Maryland
Augsburg Publishing House, Minneapolis, Minnesota
University of California, Berkeley, California

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[1]Archer Daniels Midland Company

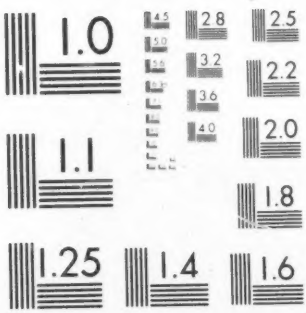
Consultative Group on International Agricultural Research, International Research in Agriculture.
Available from:
World Bank
Publications Department
1818 H Street, N. W.
Washington, D. C. 20433

Contemporary Films, To Feed the Hungry.
Color, 45 minutes, 1970.
Documentation of poverty in Chicago.
Available from:
Contemporary Films - McGraw Hill
Hightstown, New Jersey
Evanston, Illinois
San Francisco, California

Food and Agriculture Organization, The State of Food and Agriculture.
Rome, Italy: Food and Agriculture Organization, (yearly).
Available through:
UNIPUB, Inc.
650 First Avenue
P. O. Box 433
Murray Hill Station
New York, N. Y. 10016

Food and Agriculture Organization, A Strategy for Plenty: The Indicative World Plan for Agricultural Development.
Rome, Italy; Food and Agriculture Organization, 1970.
Available from:
UNIPUB, Inc.
650 First Avenue
P. O. Box 433
Murray Hill Station
New York, New York 10016

Gibbons, C.A.; Catt, D.C.; Hankin, R.C.; MacArthur, J.D.; Gravel, P.B., The Problem of Collecting Data on Food Production and Farming in African Economies.
Comox, British Colombia, Canada: Peter McLoughlin Associates, Ltd., 1974.
Available from:
Peter McLoughlin Associates, Ltd.
P. O. Box 1288
Comox, British Columbia
Canada



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Hopcraft, Arthur, Born to Hunger.
Boston: Houghton Mifflin Company, 1968.
Brief sketches of the why and how of hunger in different geographic areas of the developing world such as Uganda, India, Brazil and the Caribbean.

Kotz, Nick, Let Them Eat Promises: The Politics of Hunger in America.
Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

McHale, John, World Facts and Trends: Where Man is Headed - A Multi-Dimensional View.
New York: MacMillan Company, 1972.
Available in paperback through:
The MacMillan Company
866 Third Avenue
New York, New York 10022

Organisation for Economic Cooperation and Development,
1969 Review: Development Assistance
1974 Review: Development Cooperation
Paris: Organisation for Economic Cooperation and Development
Available from:
OECD Publications Center
Suite 1207
1750 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

Organisation for Economic Cooperation and Development,
Food Aid.
Paris: Organisation for Economic Cooperation and Development, 1974.
Available from:
OECD Publications Center
Suite 1207
1750 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

PAN
Available from:
International Council of Voluntary Agencies
Attention: Cyril Ritchie
17 Avenue de la Paix
102 Geneva
Switzerland

Reidman, Sarah, Food for People.
New York: Abelard-Shuman, 1975.
TO BE RELEASED, FALL 1975.

Scott Education Division, Food: Will There Be Enough?
Filmstrip, 1973.
Teachers Guide included.
For further information, contact:
Scott Education Division
Customer Service Department
Lower Westfield Road
Holyoke, Massachusetts 01040

Senate Select Committee on Nutrition and Human Needs, National Nutrition Policy Study, 1974.
Available from:
U. S. Government Printing Office
Washington, D. C. 20402

Time-Life Films, Rich Man, Poor Man: Food.
Color, 52 minutes, 1972.
One of six in a BBC-TV series, this film examines the problems of developing countries trying to feed their people and keep their economic heads above water.
Available through:
Time-Life Films
Paramus, New Jersey

UN World Food Conference Report
Reference number: E/Conf. 65/20
Sales number: E 75 II A III
Available from:
UN Sales Section
New York, New York 10017

United Nations World Food Council, Progress Report on the Implementation of Resolutions Adopted By the General Assembly and the World Food Conference
Available from:
World Food Council
United Nations
New York, New York 10017

War On Hunger: A Report From the Agency For International Development.
Available upon request from:
Publications Division
Office of Public Affairs, AID
Room 4953
State Department Building
Washington, D. C. 20523

Ward, Barbara and Dubos, Rene, Only One Earth: The Care and Maintenance of a Small Planet.
New York: W. W. Norton and Company, Inc., 1972

B. OTHER USEFUL MATERIALS

Case Studies:

Hal Sheets and Roger Morris, Disaster in the Desert: Failure of International Relief in the West African Drought.
Special Report, Humanitarian Policy Studies, The Carnegie Endowment for International Peace, Washington, D. C.: The Carnegie Endowment for International Peace, 1974.
Available from:
The Carnegie Endowment for International Peace
1717 Massachusetts Avenue, N. W.
Washington, D. C. 20036

This study is good for getting across the complexity and in depth interaction of factors involved in agricultural development and programs to provide aid.

Sudhir, Sen, A Richer Harvest; New Horizons for Developing Countries.
Maryknoll, New York: Orbis Books, 1974.

In the first and third sections of his excellent book Dr. Sen presents general discussions on the subject of agricultural development. In the second and lengthiest part, he presents the case of India as an example of agricultural development, its needs, success and failures.

Superior material for deeper country study.

Bibliographies:

The UN agencies, for example FAO, WHO, and WMO, put out bibliographies of their publications, past and most recent. These can be ordered from:
UNIPUB, Inc.
650 First Avenue
P. O. Box 433
Murray Hill Station
New York, New York 10016
OECD provides similar service. The mailing address is:
OECD Publications Center
Suite 1207
1750 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

Publications:

Two worthy publications must not go uncited. They are valuable in keeping the student informed of present world food supply conditions and up-to-date thought in the fields of agriculture and agricultural development. They are:

AG WORLD: a monthly newspaper of inestimable worth, this publication's purpose is to keep readers in the field of agriculture and agricultural development better informed of what others are saying, reading and doing about agriculture, and to present today's best thinking about agricultural matters with far-reaching implications.
A yearly subscription is $15.00.

Orders should be sent to:
Mr. Edward L. Jackson
AG WORLD
The Webb Company
1999 Shepard Road
St. Paul, Minnesota 55116

WAR ON HUNGER: A REPORT FROM THE AGENCY FOR INTERNATIONAL DEVELOPMENT: In a short booklet form (about 15-20 pages long). Issued monthly, War on Hunger focuses on present world conditions, U. S. aid policies, and their relationships to other developed countries' aid policies, as well as citing specific programs of AID. This publication is available upon request simply by asking to be put on AID's mailing list.

Write to:
Publications Division
Office of Public Affairs, AID
Room 4953
State Department Building
Washington, D. C. 20523
Or call:
(202) 632-9141

Essay:

No study of the world food situation can be complete without reading the famous essay by Thomas Malthus, THE PRINCIPLE OF POPULATION, written in 1798. One of the collections of essays in which the eighteenth century economist's work can be found is Garett Hardin's Population, Evolution, Birth Control (San Francisco: W.H. Freeman and Co., 1974).

C. USEFUL RESOURCE ORGANIZATIONS

These pages contain a list of useful organizations, and their mailing addresses, which can provide up-to-date information for further study or classroom discussion on agriculture and agricultural development.

AGRICULTURAL DEVELOPMENT COUNCIL, INC.

Established by John D. Rockefeller III to support "teaching and research related to the economic and human problems of agricultural development".

This organization puts out many useful papers dealing with the problems of agricultural development. They are available through ADC's Papers and Reprints Series and its Research and Training Network Workshop Reports Series (the network also puts out a newsletter). The sophistication of these papers is greater than those of other noted organizations, but most can be understood by Juniors and Seniors in high school.

For further information, contact:

The Agricultural Development Council, Inc.
630 Fifth Avenue
New York, New York 10020

AGENCY FOR INTERNATIONAL DEVELOPMENT

This division of the State Department has the job of coordinating all aspects of the U. S. foreign aid programs. It puts out informative pamphlets and brochures on its work as well as the monthly War On Hunger. All AID material is free for the asking by simply getting your name on their mailing list.

For further information write:

Publications Division
Office of Public Affairs, AID
Room 4953
State Department Building
Washington, D. C. 20523

Or call:

(202) 632-9141

AMERICAN FREEDOM FROM HUNGER FOUNDATION

This organization puts out, among other things, a series of Development Issue Packets. One is the Hunger and Development Issue Packet. It contains a fact sheet on world hunger, a copy of FAO's Strategy for Planning, a bibliography, copies of relevant ODC Communiques, and other related articles.

For further information, contact:
American Freedom From Hunger Foundation
1717 H Street, N. W.
Washington, D. C. 20006

CENTRE FOR ECONOMIC AND SOCIAL INFORMATION (CESI)

CESI's main purpose is the dissemination of information about social and economic development:

- as an information service for UN departments and agencies
- as a co-ordinating service for public information activities of UN organizations
- assisting national governments in mobilizing public opinion in support of the aims and purposes of the Second UN Development Decade
- maintaining liasons with national commissions, nongovernmental organizations and other bodies at international, regional, and national levels
- producing or assembling basic material for use by national bodies, media and selected audiences
- organizing seminars, lectures, symposia and similar activities on development themes
- formulating and implementing programs designed to educate and involve youth in the development process
- issuing publications on development themes. These include booklets, brochures and, from early 1973, a periodical "Development Forum" which is printed in five languages in a newspaper format and available free of charge.

CESI's main office is in Geneva:
CESI
Palais des Nations
CH-1211 Geneva 10
Switzerland
but its New York office at the UN can be of great service to teachers and students with information and publications:
CESI
United Nations
New York, New York 10017

FOOD AND AGRICULTURE ORGANIZATION OF THE UNTED NATIONS (FAO)

The FAO puts out the greatest amount of information about the state of world agriculture. It puts out a bibliographic catalogue (the present one from 1945-1975) of FAO publications on:

- World Food Situation - basic information
- Agriculture
- Economics and Statistics
- Fisheries
- Forestry and Forest Industries
- Nutrition
- Legislation
- FAO Official Records and Basic Documents
- Vocabularies
- Directories
- Bibliographies
- Catalogues

In addition, a supplement of FAO publications comes out quarterly.

For further information, contact:
UNIPUB, Inc.
650 First Avenue
P. O. Box 433
Murray Hill Station
New York, New York 10016

In addition, the FAO maintains a Photo Library, from which it issues picture sheets at regular intervals upon request. For further information, contact:
Mrs. Marthe Lafrance
Supervisor
FAO Photo Library
Information Division
FAO
Via delle Terme di Caracalla
00100 Rome, Italy

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

OECD produces an enormous amount of first-rate material on development topics, including agriculture. Every year they publish a catalogue of publications, with monthly supplements.

For further information, contact:
OECD Publications Center
Suite 1207
1750 Pennsylvania Avenue, N. W.
Washington, D. C. 20006

Or call:
(202) 298-8755

OVERSEAS DEVELOPMENT COUNCIL (ODC)

ODC publishes four categories of very useful informative material:

- Development Paper Series: "Soft-back pamphlets intended for the general public interested in more information about development issues than is available in the press"
- Communique Series: "Briefs of about six to eight pages on important issues in the development field"
- Monograph Series: "Thorough, professional discussions of various development problems intended for professionals, academics, and students"
- Occasional Paper Series: "Studies on development topics that are relatively more specialized than those in the monograph or development paper series".

For further information, contact:
Overseas Development Council
1717 Massachusetts Avenue, N. W.
Washington, D. C. 20036

OXFAM

The OXFAM Educational Department and the OXFAM Information Office have a tremendous amount of information available in the form of information sheets, leaflets and booklets under such categories as: General Development Sheets, General Hunger Problems, World Poverty Problems, Health Problems, Nutrition, Information on Specific Countries, Trade and Aid, and Refugees. Since OXFAM is a British Organization, its information is geared towards the British public. The information is valuable and most is free for the asking.

For further information, contact:
OXFAM Information Office (or OXFAM Educational Department)
274 Banbury Road
Oxford OX2 7DZ
England

There is also a branch of OXFAM in Canada, geared to the Canadian public, which is also very worthwhile.

For further information, contact:

OXFAM of Canada
97 Eglinton Avenue, East
Toronto 315, Ontario
Canada

PROTEIN ADVISORY GROUP

The Protein Advisory Group puts out a periodical (Protein Advisory Group Periodical) of up-to-date scientific information, such as reports on synthetic foods. There is no charge for this publication.

To be put on their mailing list, contact:
Protein Advisory Group Periodical
Secretary
FAO/ WHO/ UNICEF Protein Advisory Group
United Nations
New York, New York 10017

SENATE SELECT COMMITTEE ON NUTRITION AND HUMAN NEEDS

This committee issued, in Spring 1974, an in depth report on hunger in America -- in part, an up-dating of the revealing 1968 report by the same committee.

Available from:
U. S. Government Printing Office
Washington, D. C.

UNITED NATIONS CHILDREN'S FUND (UNICEF)

For bibliographic information on UNICEF publication, contact:
UNICEF
866 United Nations Plaza
New York, New York 10017

WORLD HEALTH ORGANIZATION (WHO)

For bibliographic information on WHO publications, contact:
World Health Organization
United Nations Organization
New York, New York 10017

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